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ACORN USER

AUGUST 1992

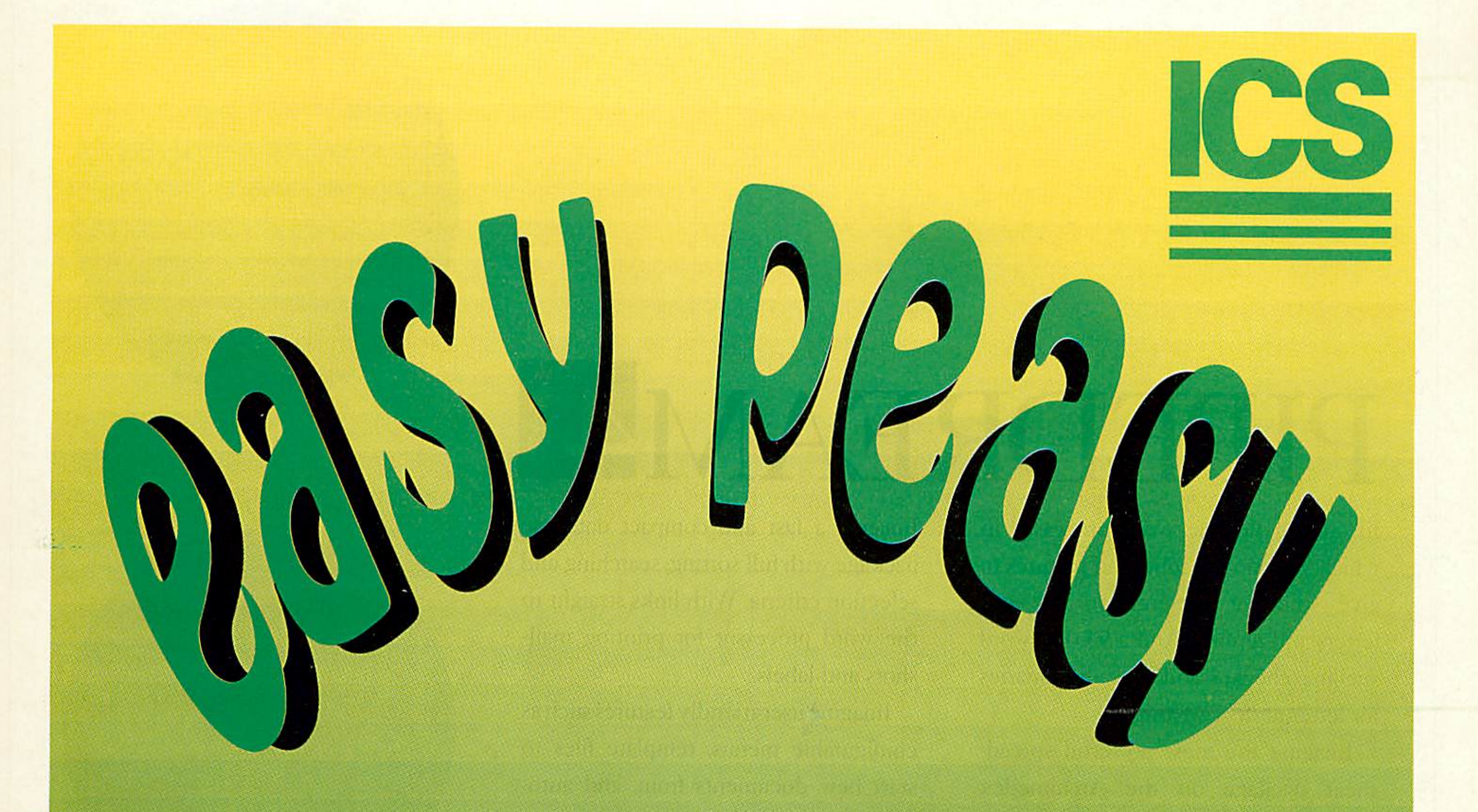
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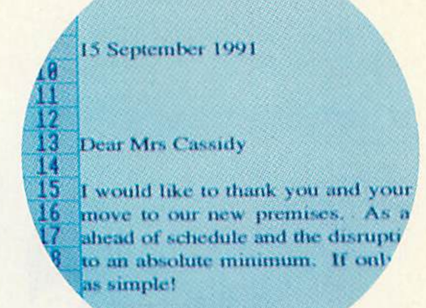
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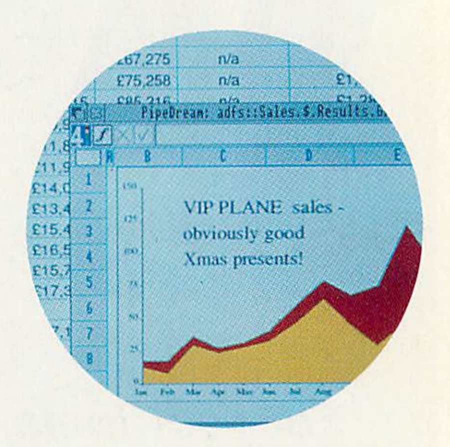
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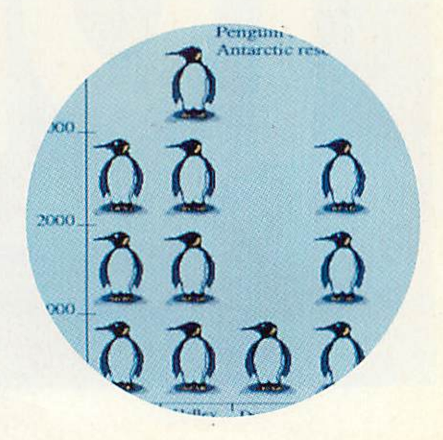
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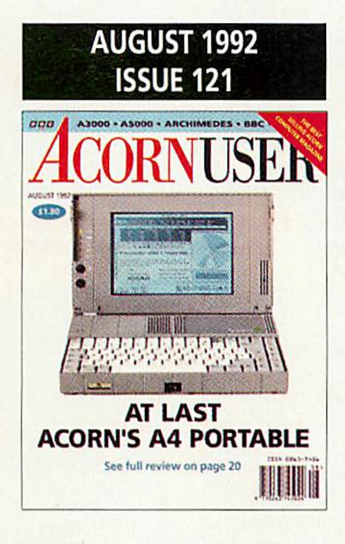
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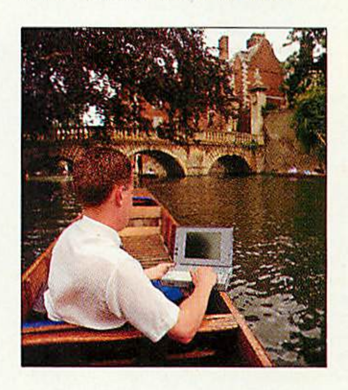


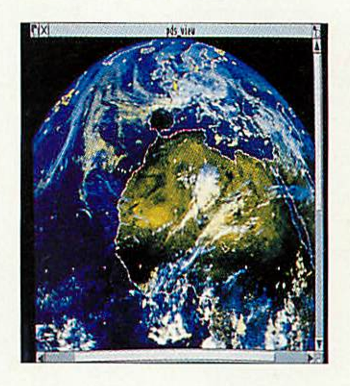
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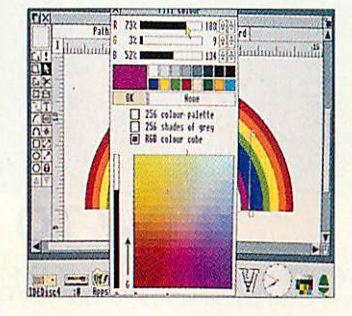
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Utility Collection	Data Store	£21
Vector	4mation	**£78•**
View»Mac 3	Human	£65
– Arc/Mac Cable	Human	£24
Vox Box	Clares	£47
Waterloo		£23
Wimp Game	Fourth Dim	£16
Wonderland	Virgin	£24
Words and Pictures	Chalksoft	£17
World Championship Boxing Manager	Krisalis	£20
World Geography Maps, draw	Micro Studio	£23
World Map Study, age 7-16	ESM	£42
World Wildlife, sprites	Micro Studio	£16
Worra Battle	Oak	£14
WorraCAD	Oak	£83
X-Fire	Fourth Dim	£21
Z88: A Dabhand Guide	Dabs	VO £15
Z88 PipeDream Guide	Dabs	VO £15
Zarch	Superior	£14
Zelanites	Micro Power	£18

HARDWARE

A5000 COMPUTERS

2Mb Hard Disc Colour System	Acorn	£1499
– as above + Learning Curve		£1530

(Finance & special schemes available)

MEMORY

Fitting extra unless otherwise stated
† Fitting easy ‡ Fitting needs expertise

A3000 2 Mb Non-upgradable †	IFEL	£55
A3000 2 Mb Upgradable †	IFEL	£63
A3000 4 Mb †	Atomwide/IFEL	£140
A310 2 Mb Upgradable soldered ‡	IFEL	£99
– as above + MEMC1a		£149
– as above + MEMC1a + fitting		£200
A310 4 Mb soldered + MEMC1a ‡	IFEL	£225
– as above + fitting		£277
– as above + fitting + OS3 carriers		£298
A5000 2-4 Mb Non-upgradable †	Atomwide	**£85•**
A5000 2-4 Mb Upgradable †	Atomwide	£109
A5000 2-8 Mb including fitting	Atomwide	£500
A5000 4-8 Mb including fitting	Atomwide	£391
A540 4 Mb †	Atomwide	£268

ideA'92 The new generation
Please see separate price list

MISCELLANEOUS

386C PC Expansion Card	Aleph One	
– 1 Mb		£463
– 4 Mb		£579
4-slot 4-layer Backplane	IFEL	£59
9060S Monitor	Eizo	£450
9070S Monitor	Eizo	£640
A300/400 Fan kit	ICS	£15
A310 RISC OS Carrier Board ‡	IFEL	£25
A5000 Fitting Kit for second hard disc	ICS	£15
ARM3 ‡	Aleph One	£199
Clares Micro Mouse	Clares	£26
Dongle Dangle with screw fittings	ICS	£6
Fan filters (pack of 10) (not A5000)	ICS	£6
FaxPack	CC	£289
Monitor Stand for A3000	ICS	£21•
Podule Case for A3000		£16
TouchWindow	Lindis	£234
Whisper Fan Quietener (for A300/A400 series only)	ICS	£15



051-625 1006

HIGH DENSITY 3½" FLOPPY DISCS

Pack of 10		£13

PRINTERS

ArcLaser 300-6	Calligraph	£895
ArcServer 300-8	Calligraph	£985
Bubble Jet BJ-10e	Canon	£205
Bubble Jet BJ10ex + TurboDriver	Canon/CC	£248
Bubble Jet BJ-300	Canon	£360
Bubble Jet BJ-330	Canon	£405
Bubble Jet BJC-800 + TurboDriver	Canon/CC	**1499•**
Laser Direct HiRes4 with 50-sheet tray	CC	£849•
– 250-sheet Paper Cassette		£99
Laser Direct HiRes8	CC	£1280
Laser Direct LBP-4 Card	CC	£325
LBP-4	Canon	£659
Refill toner cartridge for Canon EPS		£50
New toner cartridge for Canon LBP-4		£59

SCANNERS, DIGITISERS

ArcScanner including Epson GT-4000	Clares	£1660
FaxScan	Spacetech	£94
Hawk V9	Wild Vision	£199
– A3000 version	Wild Vision	£278
iMage (Sharp JX-100)	Irlam	
– for A5000		£490•
– for other computers		£589•
Image Scanner	Iota	£383
– Colour upgrade	Iota	£148
– Fast parallel card	Iota	£98
– Lighting unit	Iota	£91
i-Scan 200	Irlam	£539
i-Scan 400	Irlam	£589
Pineapple Colour Video Digitiser	Pineapple	£195
– A3000 boxed	Pineapple	£230
ProImage (Epson GT6000)	Irlam	
– for A5000		£989•
– for other computers		£1089•
Scan-Light A4	CC	£277
– with Sheet Feeder	CC	£360•
Scan-Light Junior 256	CC	£190•
– A3000 internal	CC	£190•
Scan-Light Professional	CC	£825
– as above + SCSI interface	CC	£910
SnapShot Colour Video Digitiser	Lingenuity	£195
– A3000 version	Lingenuity	£275
Spectra	RISC	£545
– A3000 Internal	RISC	£545
– A3000 External	RISC	£565
Vision Digitiser	HCCS	£49
– A3000 Internal	HCCS	£49•
– A3000 External	HCCS	£62•

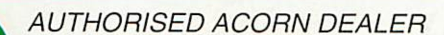
I²C PRODUCTS

AnDi Oddule	Baildon	**£30•**
I²C Adaptor (needed unless you already have an I²C socket)	Baildon	£10
I²C SWI (enhanced IIC_Control)	Baildon	£15
– bought with Oddule		£5

KEYBOARD COVERS

Seal 'n Type (spill-proof)		
– Archimedes / A5000	Kador	£14
– A3000	Kador	£14

Whisper *Keeps the fans quiet*



ICS (Ian Copestake Software)
Dept B33, 1 Kington road, West Kirby, WIRRAL, Merseyside, L48 5ET
Tel: 051-625 1006 Fax: 051-625 1007

E&OE D61 92JE22 LICENSED CREDIT BROKER



ideA'92

built for speed. The new generation of IDE interface cards from ICS leaves the competition standing.

With **background mode** operation, our new 8-bit internal interface for the A3000 is already producing speeds in excess of 800 kb/sec with certain hard discs. 1.6 Mb/sec is possible with our 16-bit interfaces. And we haven't finished tweaking yet!

Not one, not two, but three levels of **password protection** provide the security your data really deserve.

Hard discs can have **partitions** so they appear as separate drives, with separate password settings.

Almost **limitless expansion** is possible via the I²C port which our cards have always included as standard.

A3000 Internal *ideA'92* or Archimedes 'Hard Card'*

20 Mb		£189
40 Mb		£375
80 Mb	~~£649~~	£499

Archimedes Internal*

40 Mb	~~£249~~	£210
80 Mb	~~£359~~	£275
105 Mb	~~£379~~	£305
200 Mb		£499
340 Mb	~~£875~~	£775

Prices exclude VAT. Carriage free on UK prepaid orders.
*These interfaces include some but not yet all of the *ideA'92* features.

ICS (Ian Copestake Software)
Dept B33, 1 Kington road, West Kirby, WIRRAL, Merseyside, L48 5ET
Tel: 051-625 1006 Fax: 051-625 1007





UNVEILED AT LAST – ACORN'S A4

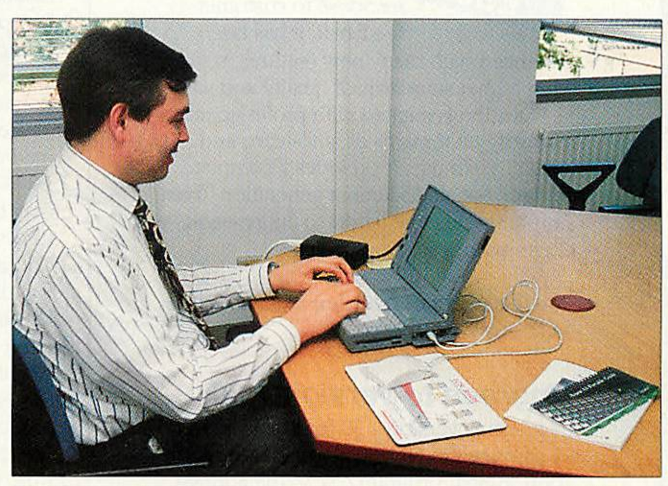
AS EXCLUSIVELY revealed in *BAU* in May, and following a lengthy gestation period, Acorn has finally revealed its first Risc-based portable computer.

The new Acorn A4 is literally an A4-sized notebook machine which incorporates the technology of the Archimedes A5000, including an Arm3 processor and Risc OS 3 operating system.

The A4, as we predicted, features an Olivetti-sourced notebook casing (Olivetti has a majority shareholding in Acorn). Complete with a NiCad rechargeable battery pack, the A4 weighs in at 3Kg (6.6lb), which is about average for PC notebook computers. The A4's Arm3 processor is clocked unusually at 24MHz, rather than the usual 25MHz, and a special power-saving mode reduces this to 6MHz. At full tilt, the A4 is considerably faster than comparable 386 PC notebook computers and Apple's fastest PowerBook portable Macintosh. Battery life is given as between 2½ and 4 hours, depending on use.

A good quality, passive-matrix 15-greyscale 640 × 480 VGA LCD screen is fitted. The A4 is restricted to displaying 15 greyscales on the LCD screen, rather than the more usual 16 or 256 greyscales for compatibility with the VIDC controller chip. All usual screen modes can be displayed using an external monitor. No colour LCD screen versions of the A4 are planned.

There is no podule bus, so expansion is limited to serial and parallel ports, an external IBM PS/2 compatible keyboard and Econet, although the latter will not be available until later in the year. Acorn decided against using an interesting integral touchpad mouse pointing device, as used on the Olivetti portable, because the touchpad only offers two buttons compared with the Archimedes' requirement for three. A conventional external Logitech three-button mouse is supplied instead, but cursor key emulation of the mouse is also possible.



BAU's news editor, Ian Burley, tries the A4 at Acorn's HQ in Cambridge



The A4 – under-arm desktop

The A4 will be available in two versions: one with a 2.5in 60Mb IDE hard drive, 4Mb of Ram and costing £1699 plus VAT; and an entry-level model which is £300 cheaper and includes a 1.6Mb floppy-only drive with 2Mb of Ram. Educational discounts take the costs down to £1399 and £1099 plus VAT respectively.

The A4 invites comparison with Research Machines' Nimbus 386 PC notebook, which is slightly cheaper but less powerful, as well as the Apple PowerBook range. Acorn points out that even the top-of-the-range Apple PowerBook 170 is less powerful than the A4, but double the price. No PC *LapLink*-type fast file transfer utilities have been developed for the A4, but Acorn expects third-party software houses to remedy that.

Pressed on whether the A4 is a one-off portable product from Acorn, the A4 product manager, Henry Howarth, said 'there are bound to be more.'

So who will buy the new A4? Bob Coates, Acorn's business dvelopment manager, confrimed that the machine will appeal most to current Archimedes owners, primarily education, business and home users looking to support their desktop machines. Beyond that, Coates also said that Acorn 'confidently expects the A4 to compete in the portable market'.

On the education side, he also said that schools will take the new machine seriously: 'Many schools who now wheel computers around on trolleys will welcome the the idea of a portable Archimedes. There is also the opportunity to take the machine away from the classroom, to use at home or for the increasing amount of field work being carried out in schools.'

Acorn's marketing director, Michael O'Riordan, told *BAU* that initial research among educational establishments had met with a thumbs-up for the machine.

Initial supplies of the A4 are limited full availability is not expected until September.

For further details contact Acorn Computers on (0223) 245200. See page 20 for our full review of the new A4.

NEWS IN BRIEF

● MEANWHILE, the set of upgrade Roms for Risc OS 2 machines has now been finalised by Acorn, and will be available in a few months. The delay is inevitable, since it will take that long for the Roms to be manufactured. The same Roms will cover all Archimedes machines, from the earliest A310s to the BBC A3000 and A5000.

The software senses which hardware it is running on and adjusts automatically. Upgrading will be a matter of plugging in four large Roms and upgrading a few applications on disc. The 300-series and early 440 machines will need a carrier board to hold the Roms, as they have more pins that the existing Risc OS 2 Roms.

By upgrading, old machines will derive many of the benefits of newer models – for example the better filer and new desktop features. There are also new versions of *Draw*, *Edit* and *Paint* applications in the Rom. But the new Roms won't make your old floppy disc drive read high-density discs. You will be able to read 720K MS-Dos discs, but not the 1.4Mb ones.

● DIGITAL Services has unveiled a total of 42 key improvements to its popular *Squirrel* database package. There are too many improvements to list here, but the good news is that existing users can upgrade to the new 1.10 release easily via an automatic upgrade disc. All registered users will be sent the upgrade automatically and for free. *Squirrel* costs £129 for the single user version, or £516 for a site licence. Contact Digital Services on (0705) 210600.

● OUR recent Roland MIDI keyboard competition has been won by Ben Adams from Cambridge. Ben correctly answered that a) MIDI stands for Musical Instrument Digital Interface, b) there are no sharps in the chord of C Major and c) the music application supplied with Archimedes computers is called *Maestro*. Ben's tie-breaking phrase was: 'I would like to win a Roland keyboard because . . . then I could Handel musical compositions and play them Bach in a minuet.'



Ovation 1.30

Announcing a major new release of the highly acclaimed desktop publisher

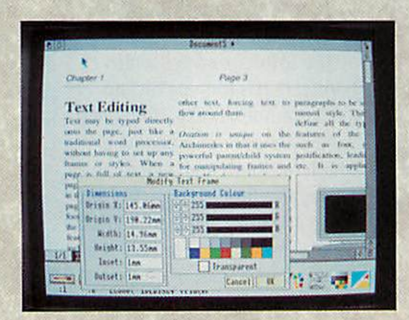




Ovation is the easy-to-use desktop publisher used on thousands of sites in education and business across the country. Now, in response to customer feedback, it has been enhanced with many new features, setting even higher standards of quality and value.

Ovation is packed with professional features, yet remains easy-to-learn and instinctive to use. It provides a complete solution for all document generation; from simple single page letters to entire books with diagrams and scanned images.

For the users convenience, Ovation is NOT copy protected.



Upgrade to version 1.30

Upgrade to version 1.30 for just £5 + VAT + £1 carriage (£6.88 inclusive). Please return your original program disc to the address below. A site licence upgrade is available costing £15 (£18.63 inclusive).

New features include

- ❑ Mail merge—Ovation documents may be merged with CSV files generated by databases and other applications
- ❑ Pamphlet printing—scaled and rotated printout for printing booklets with correctly ordered pages
- ❑ Rotated pictures—draw files may be rotated to any angle (also Sprites if you have RISC OS 3.0)
- ❑ 1st Word Plus import—1st Word Plus files may be imported with style information directly into Ovation
- ❑ Thesaurus hotlink—automatic transfer of words between Ovation and latest Desktop Thesaurus (version 1.10)
- ❑ Draft printing—fast draft printing via RISC OS printer drivers
- ❑ System font—easy-to-read non anti-aliased system font in four weights (medium, bold, italic and bold italic)
- ❑ RISC OS 3.00 compatibility—rotated text in Draw files, 256 grey-level sprites and the desktop boot facility

TypeStudio

The flexible text effects package



TypeStudio is a complete text manipulation package ideal for producing professional quality adverts, posters, banners, logos, letterheads etc.

Drawing tools allow lines and curves to be drawn to create almost any shape, along which text can be flowed. Pairs of lines may be linked to create shapes into which text and Draw files may be moulded.



A range of special effects are available, including: shadow, slant, 3D and mirror.

- Flow text along straight and curved paths
- Mould text and Draw files to shapes
- Wall floor and graduated shadows
- 3-D, mirror, slant and plinth effects
- Save in internal and Draw file format
- Print using RISC OS printer drivers
- Grid and zoom facilities
- Copy, rotate and magnify
- Import Draw files as moulds

The package includes 7 fonts and a 64-page user guide containing many worked examples.

'Of the three (packages), TypeStudio is the most comprehensive. All the tools you are likely to need are included and there is no need to use any other application with it.' *ACORN USER May 92*

Desktop Thesaurus

New Version

New, bigger thesaurus with hotlink to Ovation



Only £19

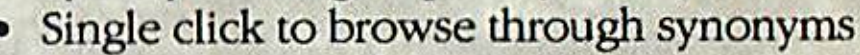
Desktop Thesaurus now contains over **13,750** keywords and nearly **135,000** synonyms. It is ideal for developing language skills in the office, in school or at home.

Ideal for use with Ovation, Impression, Pipedream, Edit, 1st Word Plus and other desktop publishers and word processors.

- Synonyms are grouped by noun, verb etc.
- Single click to browse through synonyms
- Data compressed to save disc space
- Chosen synonyms may be transferred instantly to other applications

Upgrade to version 1.10

Upgrade to version 1.10 for just £2 + VAT + £1 carriage (£3.35 inclusive). Please return your original disc to the address below.



'...works both speedily and painlessly. This one is recommended.' *ARCHIMEDES WORLD Jul 92*



RISC Developments Limited. 117 Hatfield Road, St. Albans, Herts. Al1 4JS. To order, or for more information, call (0727) 40303

All software is suitable for Archimedes, A5000 and A3000 systems with 1Mb RAM and RISC OS 2.00 or 3.00.

Prices include VAT but please add carriage of £3.10 for Ovation and £2 for other products.

All prices are for single user versions—site licence prices available on request.

ARM DIPS INTO APPLE'S P.I.E.

TECHNOLOGY originally developed by Acorn has been used in a revolutionary pocket computer from Apple Computer, the Newton.

The Apple Newton features the ARM610 Risc processor, developed by Advanced Risc Machines (Arm) Ltd, the chip manufacturing company jointly formed by Acorn, Apple and VLSI Technology.

The Newton heralds the introduction of a diverse range of products called Personal Digital Assistants (PDAs). The new hand-held device enables hand-written words and sketches to be transformed into clean type and graphics.

The new division formed to undertake PDA projects is called the Personal Interactive Electronics division (or Apple P.I.E!).

Features of the Arm610 processor include lower power consumption, very compact dimensions, improved performance by up to 40 percent via a write buffer and a new on-chip memory manager. The Arm610 is a descendant of the Arm3 processor, currently used by Acorn in the A5000, A540 and new A4 notebook computers.



Arm technology lies at the heart of Apple's Newton

Apple chairman, John Sculley, personally introduced the Newton to a gathering of journalists at the recent Consumer Electronics Show, which I attended in Chicago. Newton is said to be very much a pet project of Sculley's and he declared that PDA products would create a multi-billion dollar industry by the end of the decade.

Consumer electronics giant Sharp will manufacture Arm-powered Newtons for Apple in Japan and it will be developing an own-brand version for the Japanese market. Apple wants to license Newton technology to more third parties and if there are takers, Arm could once more become the most prolific Risc processor.

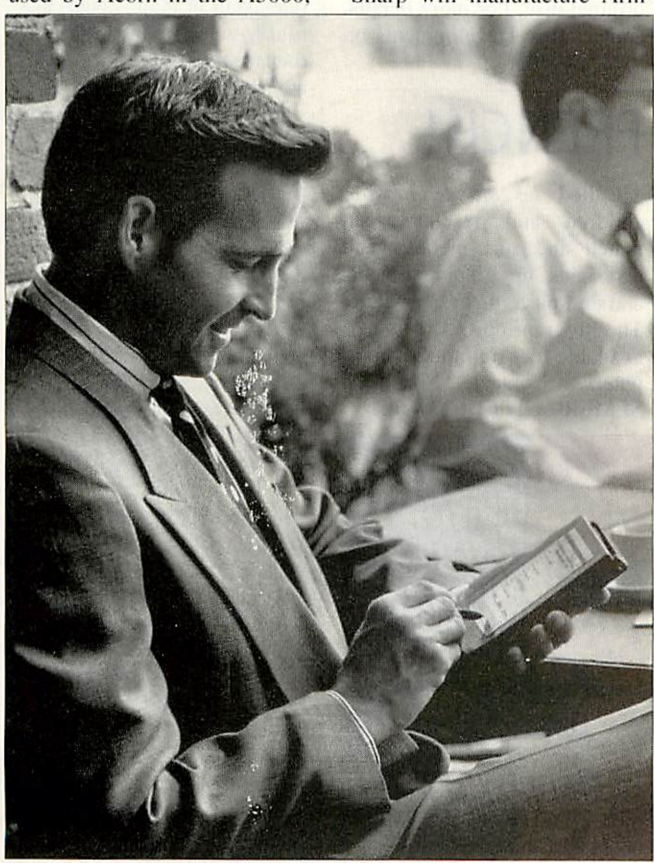
This prospect has been a major boost for Arm Ltd. This has resulted in Acorn's share price continuing its seemingly inexorable rise – heading for the mid-30p region at presstime, compared with 6p a couple of months ago.

Newton differs from existing portable or pocket-sized computers in that it has been designed from the outset as an intelligent device which can not only recognise hand-written input (there is no keyboard) but can help plan your daily routine and communicate with other devices via infra red and even cellular telephone links.

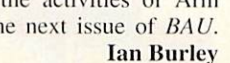
Newton makes use of an advanced object-oriented operating system, which is not compatible with either Apple Macintosh or Archimedes software. Newton's software development system has both C-like and artificial intelligence language features and is referred to as 'Dylan' in-house. Newtons are known as 'Newts' for short.

Apple says it is confident that Newtons will be ready for sale in the first half of next year.

Watch out for a special feature on the activities of Arm Ltd in the next issue of *BAU*.



Personal data assistants make scribbles legible



Ian Burley

NEWS IN BRIEF

● LIFE has been hectic at Arch Images, the recently opened Postscript print bureau dedicated to Archimedes users. Customers, including doctors, accountants, clergymen, graphic artists, teachers and business people, have apparently come from as far apart as The Orkneys and The Netherlands. So far, the company has met customer requirements which have ranged from a 600-page book to compact disc labels. Proof, if it was needed, how Archimedes users make good effective use of their computers. Contact Arch Images on (0733) 375424.

● LONGMAN Logotron has collaborated with Acorn, Cambridge Education Associates and Longman Industry and Public Service Management to produce a primary school management package for use with Acorn computers running Risc OS. The system is designed to manage pupil and staff records, purchasing, budgeting and accounting. Apparently, most primary schools currently make do with inadequate packages primarily designed for secondary schools and, as the BBC A3000 is the most common computer in primary schools, it was the obvious platform for the new package. Contact Longman Logotron on (0223) 425558.

● EDUCATION specialist, Sherston Software, has released three new BBC micro adventure programs for youngsters, as well as one for the Archimedes. For the Beeb there are *The Three Little Pigs at Home* (£25 plus VAT), *Peek-a-boo around our house* and *Peek-a-boo at opposites* (both £21.50 plus VAT). For the Archimedes/A3000, Sherston has produced the classic Simon Hosler educational adventure, *The Crystal Rain Forest*, priced at £35 plus VAT. The adventure features gentle humour, educational puzzles and graphics which Sherston says takes full advantage of the Archimedes. Contact Sherston Software on (0666) 840433.

● DON'T forget to make a note in your diary to attend the BBC Acorn User Show, which takes place at London's Wembley Conference Centre from 16 to 18 October .

REVISIONS MADE TO OVATION

KEY revisions have been made to Risc Developments' desktop publishing package, *Ovation*. The five main enhancements include: mail merge; pamphlet printing; draw image rotation; *First Word Plus* file importation, and a hot link to the latest version of Risc Development's *Desktop Thesaurus* utility.

The mail merge facility means that *Ovation* documents can now be merged with CSV files generated by other applications, such as databases. Pamphlet printing allows pages to be scaled and rotated correctly for easy compilation of booklets and pamphlets. As well as now offering rotated draw file images, Risc OS 3 users can now rotate sprite images.

A fast text-only draft print option has also been added, along with improved draw image rendering and improved key short cut options. The system font can now be displayed in four weights (medium, bold, italic and bold italic). Program disc copy protection schemes have been removed.

This latest version of *Ovation* stays at its old price of £99 plus VAT and existing users can upgrade by sending their old program disc back to Risc Developments with £5.



Standing ovation for improvements to Risc Developments' DTP package

Improved data compression has enabled Risc Developments to increase the number of keywords and synonyms in its recently introduced *Desktop Thesaurus* utility, yet keep the overall dictionary file to below 450K in size. Version 1.10 now has nearly 14,000 key words and 135,000 synonyms.

The *Ovation* hot-link facility has been added to this version as well. The price remains £19 plus VAT and existing users can upgrade for £2 plus their original disc. For more details, contact Risc Developments on (0727) 40303.

CHEAPEST A3 PRINTER

CALLIGRAPH, the Cambridge firm which is best known for its range of fast direct-drive laser printers for the Archimedes, is claiming that it has produced the world's most compact and cheapest true 600dpi (dots per inch) A3-format laser printer.

In the same way that some 300dpi laser printers can be driven to an 'apparent' 600 dpi, the Calligraph TQ-1200 can be driven to a 'pseudo' 1200dpi.

The printer uses a Toshiba laser engine which is the world's most compact for the A3 page size. The printer, including an Archimedes laser card, is priced at £4,995 plus VAT, which is apparently half the cost of some competitive offerings. Contact Calligraph on (0223) 316144.

PARDON MY FRENCH!

NORTHWEST SEMERC (Special Education Micro Electronics Resource Centre) has produced a skills development package for the Archimedes which has been designed to stimulate spoken and written French in children from nine years old upwards.

Called *Le Monde à Moi*, children and teachers can match and sort pictures and text, pick up graphic objects and and place them elsewhere. The program costs £15 and is available for Archimedes computers. Contact Northwest SEMERC on 061-627 4469.



NEWS IN BRIEF

● COMPUTER Concepts has chosen a new A4 300dpi flat bed scanner unit for its ScanLight Professional package. This has allowed CC to sharply reduce the price of ScanLight Pro by around one third to £595 plus VAT. One year's on-site maintenance is now included.

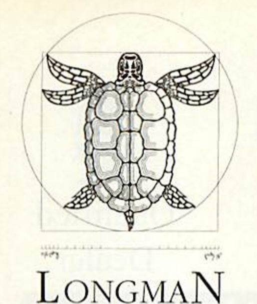
The new 300dpi, 256-greyscale scanner is an extremely compact Canon unit not much larger than its A4 scanning area. Connection to the Archimedes is via a SCSI interface, which is an optional extra costing £150 plus VAT if you don't already have one. All Computer Concepts' ScanLight scanners, including the latest hand-held versions, now come with revised software which offers a greater range of image enhancement facilities and real-time greyscale dithering, compatible with Acorn's 256 greyscale sprite format.

The new scanner and software will form part of the Acorn Publishing System. Contact Computer Concepts on (0442) 63933.

● THE SERIAL Port is releasing a range of new products for the Archimedes. An eight-port serial interface can cope with data rates up to 38.4Kbps, double that usually supported by Archimedes comms software. No price was available at press time.

There is also an ISDN (integrated services digital network), two-channel, high speed (up to 64Kbps) interface card for use with an ISDN terminal adaptor which then plugs into your ISDN digital phone line. The card is expected to sell for £250 plus VAT on its own, or £750 with a BT-approved terminal adaptor. The card is compatible with The Serial Port's *Arcterm 7* comms package. The Serial Port's Archimedes bulletin board, The World of Cryton, is now fitted with an ISDN port. If you have a suitable ISDN equipped terminal you can try it out by dialling (0749) 670833.

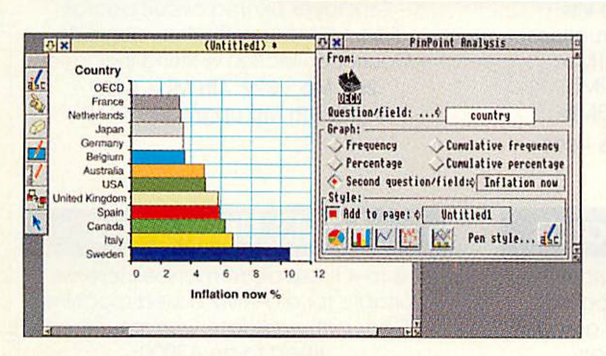
Finally, The Serial Port has produced an interface which enables high-quality PC keyboards to be used with most Archimedes models, except the A3000. The device is an external box which plugs into the normal keyboard socket. The interface costs £89 plus VAT or £109 complete with 'a nice PC keyboard'. Contact The Serial Port on (0749) 670809.

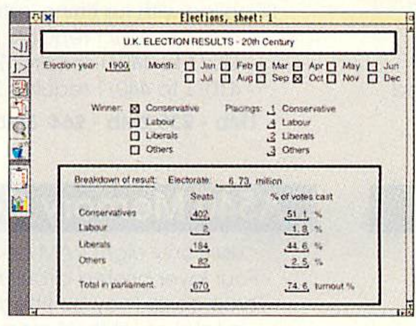


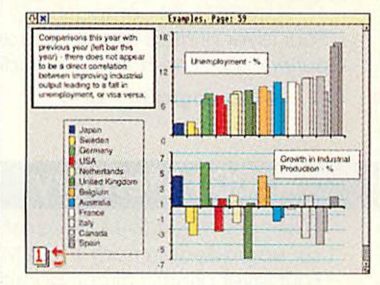
LONGMAN LOGOTRON

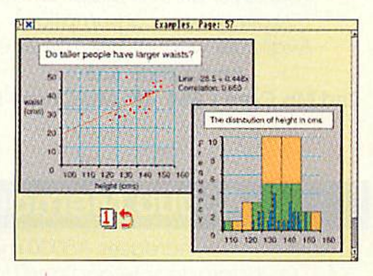
PinPoint

> “The ease with which data collection may be organised and implemented is a joy.”
>
> **Frank Jukes, Micro User, January 1992**

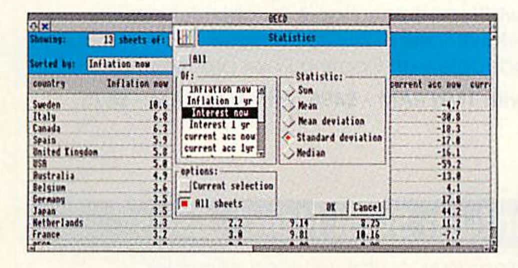


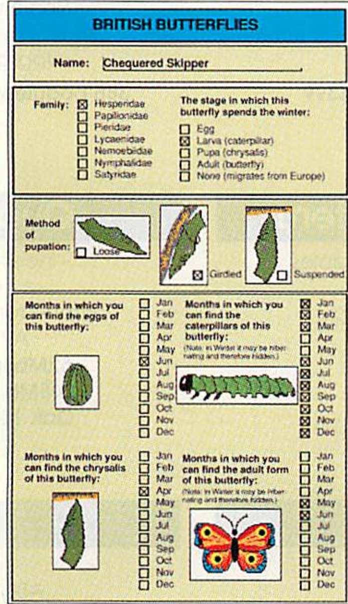




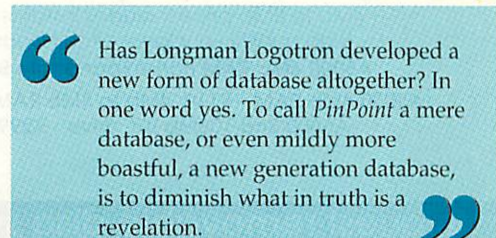


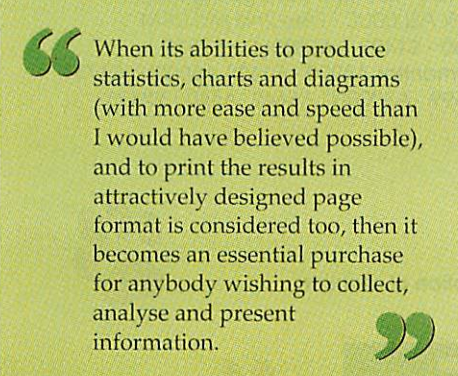
> “*PinPoint* is certainly a new generation database, making the handling of data as easy as it should be. Its concept and execution is brilliant — data handling is about collecting data efficiently, and that is what *PinPoint* does. *PinPoint* is powerful yet simple to use and will take educational data-handling into a new era.”
>
> **Dave Futcher, BBC Acorn User December 1991**



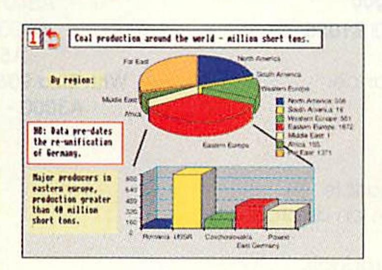


> “Has Longman Logotron developed a new form of database altogether? In one word yes. To call *PinPoint* a mere database, or even mildly more boastful, a new generation database, is to diminish what in truth is a revelation.”
>
> “The scope and variety of *PinPoint* is quite astonishing. The sheer variety, the power, the complexity of this program is astounding. The analysis and display aspects are both powerful and attractive enough to operate in both an educational and business environment. Databases will never be the same after this.”
>
> **Duncan Evans, Archimedes World December 1991**



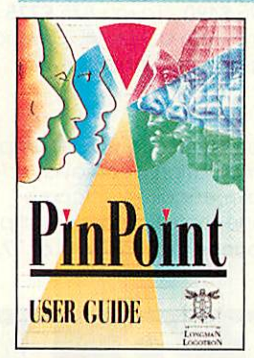


> “*Pinpoint* takes databases into a new dimension in several ways. First, form design. *PinPoint* is about as adaptable as the best desktop publishing package when it comes to creating the form upon which information will later be entered and stored.”
>
> “When its abilities to produce statistics, charts and diagrams (with more ease and speed than I would have believed possible), and to print the results in attractively designed page format is considered too, then it becomes an essential purchase for anybody wishing to collect, analyse and present information.”
>
> **Chris Davies, Times Educational Supplement, November 1991**

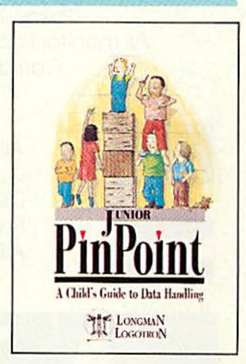


Longman Logotron
124 Science Park
Milton Road
Cambridge CB4 4ZS.

Tel. (0223) 425558
Fax (0223) 425349



PinPoint for the Acorn Archimedes is priced at £99. A Site Licence costs £400.



A special version for primary schools is priced at £24. A Site Licence costs £72.

24-BIT COLOUR AT BAU SHOW

A NEW 24-bit colour graphics accelerator costing less than £250, which is compatible with Risc OS screen modes, will be shown at the *BBC Acorn User Show* in October. The device is being developed by State Machine, a brand new company dedicated to developing innovative new expansion products for the Archimedes.

The company has been formed by two well-known names in Acorn hardware and software development circles, Chris Honey and Justin Fielder, both of whom have contributed to various products by companies such as Computer Concepts and Watford Electronics.

State Machine's new eight-bits per pixel enhanced graphics accelerator, which should be available in August, includes 800 × 600 pixel 256-colour and 1024 × 768 pixel 16-colour modes, with colours selectable from a palette of 16.7 million, compared with the standard machine's 4,096 colours. The card will also feed certain monitor modes like 1152 × 852 16-colour or 1280 × 1024 four-colour. Even if you don't have a big monitor, a virtual window mode lets you see part of a big screen mode and pan or scroll it.

Up to 50 percent less processor bandwidth will be required, thus preventing over-saturation of the computer's Arm processor. A sub-£1,000 professional board which offers full 24-bit colour graphics for users requiring on-screen photo-realism is also on the drawing board and could also be demonstrated at the *BAU* Show.

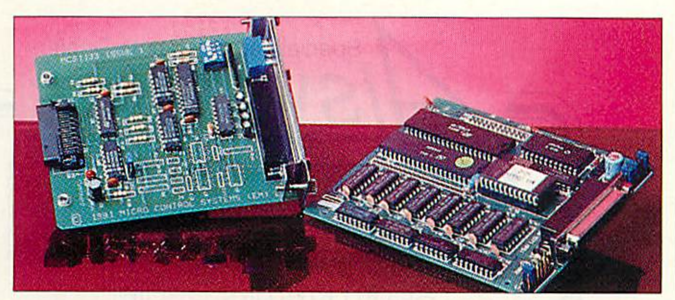
Both cards will be Risc OS compatible, but State Machine is working with outside software houses to ensure that the card's 24-bit colour features will be fully exploited. Contact State Machine on (0582) 484266.

PRINTER BUFFER CARDS

A NEW range of printer buffer cards for the latest Epson dot matrix printer models has just been released by Nottingham-based company, Micro Control Systems.

Suitable for all recent and current Epson printers, the 'B' series of printer interfaces simply slide into position within the printer. Offering a serial (RS232) port and, optionally, a printer buffer of 32 or 128K capacity, the unit 'soaks up' the data from the computer, releasing it for other tasks.

For further information, contact Micro Control Systems, Electron House, Bridge Street, Sandiacre, Nottingham. Tel: (0602) 391204.



DIXONS' SUPPORT

AT A recent Acorn Game Developers' forum, Dixons' buying director, Alan Dickinson, rejected criticism that the Archimedes was poorly supported by the 1,000-strong high street electrical retail chain.

He apparently stressed support for the Acorn platform, indicating that 1992/93 would see greater opportunities for those gathered at the forum. We live in hope – your news editor's local Dixons outlet has a special computer section, but there was no sign of any Acorn equipment.

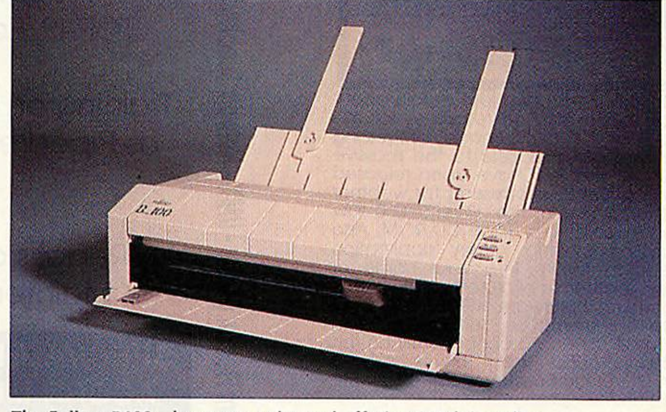
Well, watch this space, as they say.

NEW FUJITSU LOW-COST INKJET

FUJITSU has introduced a new low-cost, monochrome ink-jet printer – the B100 – which is a cheaper alternative to the company's existing Breeze 200 model.

The printer is said to be exceptionally quiet and prints to 300dpi (dots per inch) at up to 160cps (characters per second). Epson, IBM and HP Deskjet Plus emulations are included as standard.

The B100 has a recommended price of £349 plus VAT. Contact Fujitsu Europe on 081-573 4444.



The Fujitsu B100 – low cost, quiet and offering 300dpi quality

NEWS IN BRIEF

● ACORN has confirmed the speculation, first revealed in *BAU* last month, that it has dropped one of its three distributors, Bonsai Distribution. Unfortunately the news came too late for us to investigate further and it is still uncertain whether another Acorn distributor, AB, is to be dropped as well. As mentioned last month, Acorn seems intent on stepping up its own distribution efforts, thereby cutting out third-party distributors.

The loss of Bonsai could cause difficulties for smaller Acorn dealers who prefer the centralised supply of third-party Acorn products. Watch out for further details net month.

● THE 1991 *Hutchinson Electronic Encyclopaedia* CD-Rom has been ported to the Archimedes platform and makes full use of the Risc OS desktop. Powerful subject and keyword searching is offered and the CD-Rom contains 25,000 articles with 8,000 hyperlink connections. The disc is mainly text-based, but there are some graphic illustrations and sound tracks to accompany articles. The CD-Rom is priced at £99 plus VAT and was produced in association with PEP Associates. It is marketed by Attica Cybernetics Ltd. Tel: (0865) 791346.

● WEST Glamorgan music teachers attending part of Advisory Teacher John Mills' recent Music and IT initiative were greeted by an Acorn BBC A3000 computer playing Mozart's 40th symphony. The computer was playing out of Studio 24 Plus and the MIDI transcript of the entire symphony is available from Oscar Music Productions Ltd, priced £49.99. For further details contact Oscar Music on 071-377 6294.

● JAMES BOWDEN, who is 19 years old and visually impaired, has designed a computer package based on a BBC Micro and *Wordwise Plus* which the Royal National Institute for the Blind says is a major breakthrough in the field of foreign language study for the visually impaired.

Bowden was frustrated by the lack of foreign literature available in simplified braille form for modern language students.

Contact the RNIB on 071-6361153.

Everything you want to know about your Archimedes.. you can find in RISC User magazine

RISC USER

The most popular subscription magazine for the Archimedes, A3000 and A5000

Celebrates the 10th anniversary of its parent company BEEBUG

For subscription (£19.90 a year for UK) phone 0727 40303 fax 0727 860263 or write to the address below

RISC User is a high quality magazine devoted totally to the Archimedes range of computers. It is published by RISC Developments, formed last year from BEEBUG, which has been established for over ten years as one of the foremost companies in the Acorn market.

RISC User is produced by a dedicated and enthusiastic professional team which benefits from10 years of experience gained in publishing the popular BEEBUG magazine for the BBC micro and the Master 128.

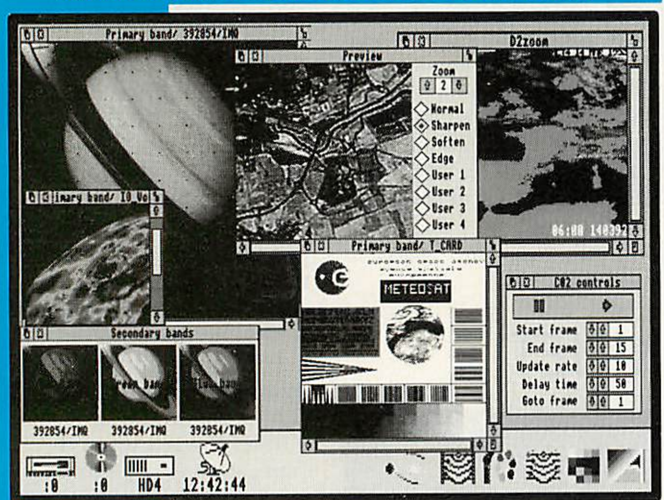
RISC User can also call upon BEEBUG's (now RISC Development's) considerable expertise as a major software and hardware developer for the Archimedes range.

With a RISC User subscription you will receive not only 10 magazines a year (delivered free to your home), but you will benefit from all the help and support a professional organisation can provide:

- Technical help with all RISC Developments' products and publications
- RISC Developments' own range of high quality hardware and software with special discounts for magazine subscribers
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PDSview

Planetary Data System £99.50

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Please write or telephone for complete details about our wide range of space science resources for the archimedes, including the new image processing package,PDSview that gives access to the massive databank of NASA images that have been released as well as providing powerful processing for weather satellite or any other digital image. Over 27000 raw data images are available from us on CD-ROM. Also ask about the award winning !Orrery application which brings the planetarium into your home or classroom.Our new weather satellite software which is compatible with existing hardware will be out soon. This allows up to six animation sequences, with unlimited frames, to be collected concurrently on the desktop as a background task. This is truly a BREAKTHROUGH in the field of meteorological satellite image data collection.

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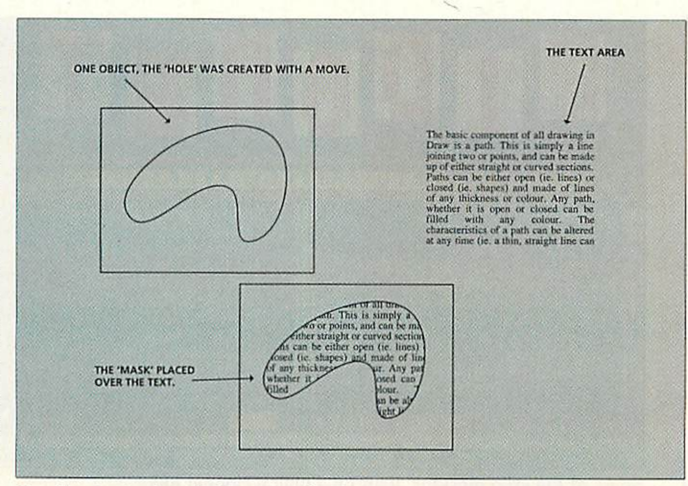


PICTURE BAY – DRAW SPECIAL

EVERYONE who has an Archimedes will have a copy of *Draw*. It is a powerful and complex piece of software that can be used for all sorts of applications, from simple design work (doodling!) to quite passable desktop publishing.

The basic component of all drawing in *Draw* is a path. This is simply a line joining two or more points, and can be made up of either straight or curved sections. Paths can be either open (lines) or closed (shapes) and made of lines of any thickness or colour.

One feature, often overlooked, is the ability to have a single path made up of apparently separate lines and/or curves. Inserting a 'move' into a line instructs *Draw* to temporarily finish the path at the current point and then start again elsewhere. Moves can be inserted into lines to make holes in objects so that anything behind shows through, creating a mask.



Creative text using the Draw application

To finish with, above is an example of text in a shape. First create your shape using the closed curve tool but before finishing it, click on the move icon on the tool box and draw a box around your shape (making sure you use the closed line and not the rectangle tool). Set the fill colour of the mask to white and then drag a small text file into *Draw*. Bring the mask to the front of the picture and resize it to fit over the text and hey presto, you have a mask.

I'll have more *Draw* hints next month and would be pleased to cover any topic that readers are having problems with.

All letters should be sent to the address on this page and marked 'Picture Bay'.

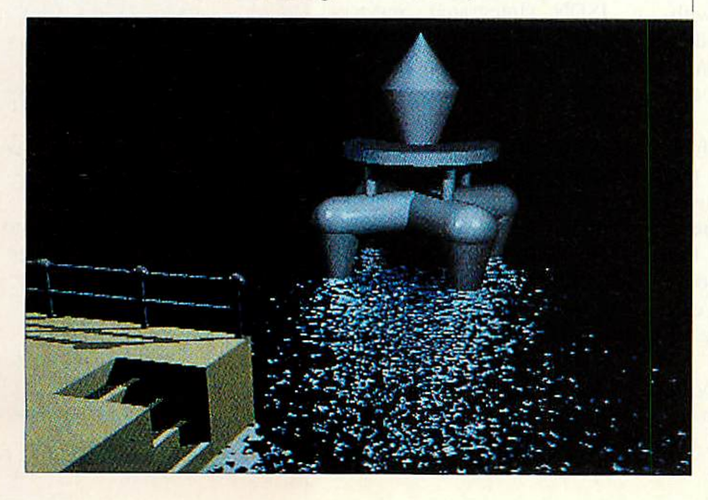
READERS' PICTURES

RAY tracing again makes this month's top slot for readers' images.

Water by William Pragnell was created on a standard A3000 using the public domain ray-tracer *Rayshade*. *Water* is included on this month's subscribers' disc.

The readers' pictures section is open to all your Arc and Beeb users. We are looking for interesting graphics which you have created with your machine. We would also like to hear what techniques and packages you used to create those images.

Each month, we select the best image to use on this page and we usually include other readers' work on the monthly subscribers' disc. So why not let us see your work?



PORTABLE ART

WITH the arrival of the Acorn A4 portable (see review p20), it is now possible to create art wherever you want – albeit on a mono screen, until Acorn launches a colour version. Just when that flash of artisitic inspiration hits you, you can doodle to your heart's content, wherever you are.

Which leads me on to the reason why Longman Logotron's art package, *Revelation*, should have hot-keys. You would want to keep the use of the mouse to a minimum on a portable, so some method of bypassing all the menus would be particularly useful.

Painting on the portable isn't that daft an idea. The screen quality is good and a quite passable grey scale can be achieved with dithering.

It would be quite easy to create outlines and complete all the colour work on a full-scale Archimedes later.

NEWS IN BRIEF

● PUBLIC domain libraries are an excellent source of pictures, clip-art and graphic demos. One such library is Third Millennium, run by Jean Van Mourik, which contains work from a number of people, including *BAU* regular, Jan Vibe.

Third Millennium specialises in the more abstract areas of computer art such as Mandelbrots and cellular automata, and even sells prints and T-shirts with designs from its programs. For details contact Third Millennium, 4 Pantllyn, Ammanford, Dyfed SA18 3JT.

I'd be pleased to hear from any PD libraries that specialise in graphics. Please send information (and possibly examples) to the address below.

● IF YOU want to see extremely good examples of state-of-the art computer graphics, go and see the movie, *The Lawnmower Man.* Loosely based on a Stephen King short story, the film tells the tale of a retarded gardener who swaps his mundane lifestyle for a new world – virtual reality.

The visuals are a cross between those seen in films such as *Tron* and *Terminator 2*, with a hefty dose of extra imagination. If your idea of a good film demands a mix of horror and special effects, it's worth checking out.

● A NEW disc-based magazine has been started by CoinAge, the authors of The Fourth Dimension's *Boogie Buggy*. *Power to the Programmer* is mainly written for games programmers and contains articles about various programming techniques, including screen swapping.

The current (No 1) issue is available and can be obtained by sending a £1 coin to: CoinAge Ltd, 1st Floor, 23 Cooper Street, Nelson, Lancs., BB9 7XW.

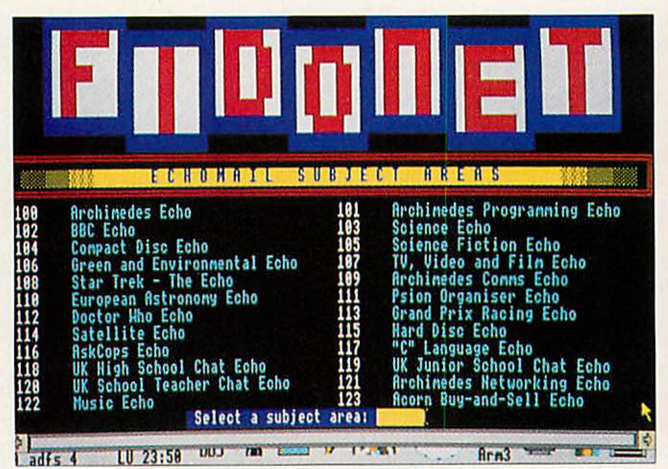
● ANY news, comments, questions on graphics, as well as submissions for the Readers' Pictures section, would be welcomed.

Please write to Rob Miller, The Graphics Page, *BBC Acorn User*, Redwood Publishing, 101 Bayham Street, London NW1 0AG.

FIND NEW FRIENDS WITH FIDONET

Fidonet is a non-commercial network of computer hobbyist bulletin boards linked by a telephone packet-based message exchange system.

FidoNet was the first of the several hobbyist message networks that now exist. It is supported entirely by its users, and in many ways is similar to ham radio. Apart from a few mandatory rules, each sysop runs his or her system in any way they please, and for any special interest they choose.



Some of the echo message areas on a typical Fidonet BBS

Like ham radio, FidoNet extends worldwide and makes it possible, for instance, to launch a query about one subject to a UK BBS and have the answer come back from Australia a few days later! It's possible to send messages publicly, inviting comments from everyone linked into the system reading it, or privately only to a person known to be accessible on a FidoNet system.

To connect all the bulletin boards together, someone has to pay for the telephone calls, but 'routing' makes this inexpensive. Each bulletin board link usually has to call only one other to exchange messages, which then spread out, link by link to the whole of the rest of the system. Thus the cost of the calls may need only be at local rate. The public message conferences are called 'Echoes' because of the way that messages are reflected back and forth throughout the system.

Some enthusiastic users who are appointed as 'Hosts' for message collection and distribution, subscribe to bulk calling systems, such as BT's Midnight Line system in the UK which, for a moderate fee, allows unlimited calls during the night.

The host collects a number of much smaller fees from participating users and his system dials out to each 'node', exchanging messages automatically at night, removing the need for the node to make any outgoing calls at all.

FidoNet provides an inexpensive way to make new friends worldwide and exchange knowledge about myriads of interests – both in computing and almost any other subject.

In forthcoming issues, I'll be explaining more about the fascinating world of FidoNet, and how a bulletin board sysop can go about making their system a FidoNet node.

ONLY CONNECT

Now that lower-priced high-speed modems are becoming available, many bulletin boards are upgrading to offer a wider range of connect speeds. This has resulted in reports of logging-on problems from users of older modems, notably users of V23 (1200/75).

A successful V23 connection can often be made by waiting for one or two seconds for the answering modem to scan down the speed range before letting the V23 modem send its carrier tone. This can be done manually with an 'on-line' switch, or by the software 'connect' function.

BBS users with WS3000 modems have also had problems, and Miracom's technical support department has suggested that updating the WS3000 software will help.

Roger Sewell, a stalwart BBS user, has come up with his own solution. He has discovered that the Call Progress Monitor function of the WS3000 needs to detect an older style answer tone before it will connect, ignoring the newer sequence of answer tones from the high-speed modems. By disabling the C.P.M. feature with the command AT&C0, the WS3000 can connect to the newer type of modems successfully.

Miracom is always ready to help with modem problems – the technical support staff are on (0206) 844834.

CRYTON

The World of Cryton – the first and original Archimedes bulletin board, can now be accessed from ISDN.

ISDN (Integrated Services Digital Network) interfaces allow a connection rate of 64kbps to TWoC. When it comes to transferring actual files this translates to 8Kbps, or 480Kb per minute!

Few users will be lucky enough to have access to ISDN yet, or to be able to afford the high monthly rental, but for those select few who do, the ISDN access number is (0749) 670833.

The Serial Port will be marketing an ISDN interface card for the Archimedes later on this year.

NEWS IN BRIEF

● CURRENT RELEASES: Version numbers of popular Archimedes Terminal software are: ArcComm 2 – 2.20; Longman Logotron ARCterm7 – 1.40; The Serial Port Hearsay II – 2.12

● A NEW BBS on the line is Chaos Information, on (0633) 222475 at 'all speeds - 24 hours', with over 211Mb of dedicated Archimedes programs for download. Chaos also boasts over 46 different FidoNet echomail areas. Initial access is free, but subscribers will get more time and full access to the FidoNet system.

● *KILLER*, the virus eliminator program, is no longer available from Acorn Support Areas on bulletin boards. It is now marketed by Pineapple Software, and deals effectively with all known viruses.

The current version is 1.36, and is available from Pineapple by phoning 081-599 1476. The £28.20 (inc VAT) charge forms a year's subscription and includes free updates. This program is a must for all users of bulletin boards, and all downloads should be checked before they are de-archived.

● A NEW very fast modem standard (VFAST) is being developed by the CCITT which, by using 24Kbps, or even 28.8Kbps, and V42bis compression, could achieve a throughput of over 100Kbps! The Institute of Electrical Engineers (IEE) is arranging a conference on data transmission to discuss VFAST and ISDN and other key issues in September. Further details can be obtained from the IEE Conference Office on 071-240 1871 Ext 222.

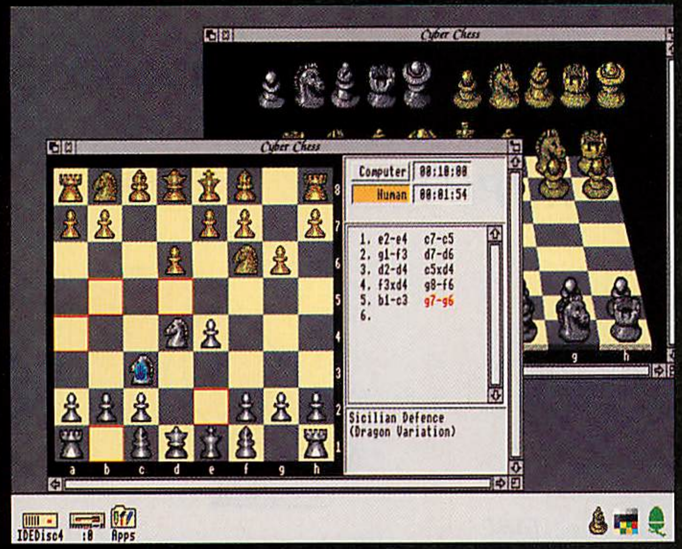
● We are sorry to hear that Rich In Paradise BBS (featured in the BAU June issue) is closing down, but Richard Paddle is still active online as moderator of the 'Acorn Buy' FidoNet Echo.

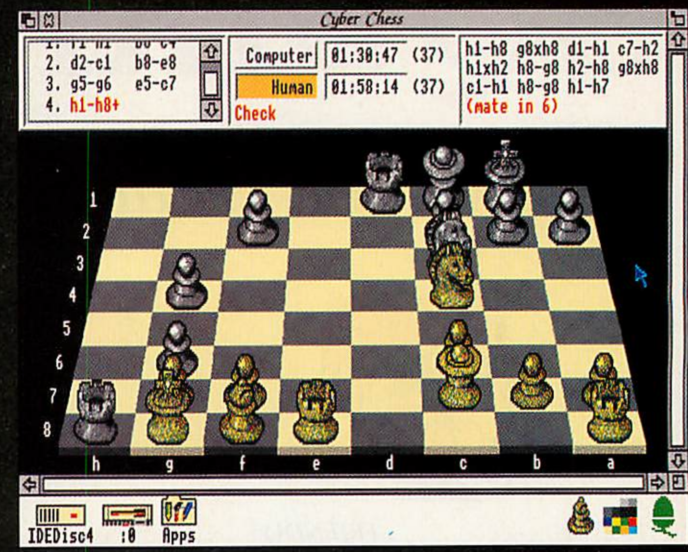
David Dade

YOU can contact me with any news or information you'd like to be included by writing to: David Dade, *BBC Acorn User*, 20-26 Brunswick Place, London N1 6DJ, or by modem on Arcade BBS, User #2 081-654 2212 or 081-655 4412 . Please remember that there is a three-month lead time, so get your news items to me well in advance.

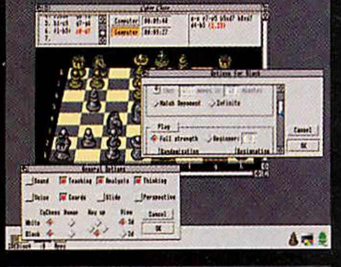
PRODUCED by The Fourth Dimension .... THE Acorn Games Specialists

Cyber Chess





"The Definitive Chess-Playing Program"









Chess is probably the most popular game in human history. It has survived for fourteen centuries and is as successful today as ever. Thousands of people have dedicated their lives to its study and over ten thousand books have been published on its theory.

Now the Fourth Dimension is bringing the full magic of the game to Archimedes owners with its latest product, *Cyber Chess.* This represents one of the highest specification chess-playing programs available for *any* micro-computer. Over three sides of A4 paper is needed just to name the features present in the program. Some of its main points are:

SUPERB 3D SIMULATION

- A near complete 3D simulation of the game. Animation is used to move the pieces smoothly around the board; pieces are picked up and dragged by the human player to their new squares.
- Designed for total clarity. The board is carefully arranged so it can be played from without difficulty. A large alternative 2D view is also provided as an option.
- High-quality digitized stereo sound and speech.

RISC OS COMPLIANT

- Runs from the desktop in a window; fully multi-tasking and intuitive; follows the 3D style associated with high quality software.
- Multi-windowed. Any number of games can be opened and running from one incarnation of the program (within available memory). A sophisticated internal scheduling algorithm allows *Cyber Chess* to drive all computer opponents/games simultaneously whilst still smoothly multi-tasking with other desktop applications.

FIDE RULES

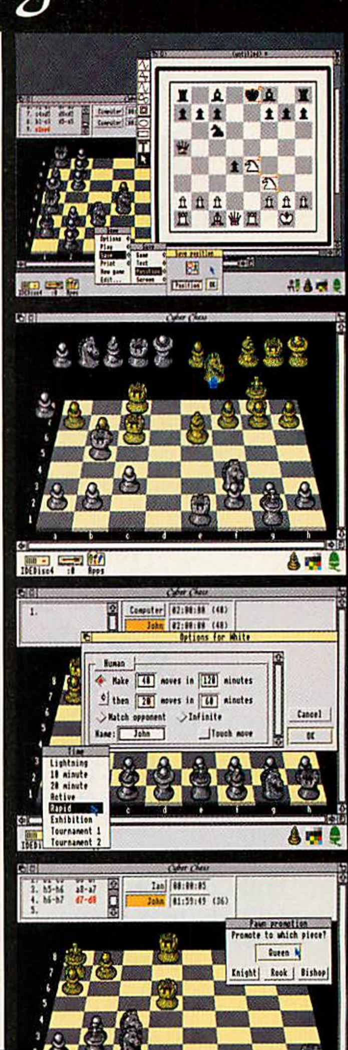
- Full implementation of all applicable chess laws, including en passant captures, underpromotions, 50/75 move rule etc. Even resignation and draw by agreement are supported.

HIGH SPEC MACHINES

- Optimised for an ARM2, mode 12 system. But takes full advantage of a faster processor or even extra RAM to produce a higher 'full strength' playing standard and smoother animation.
- Thoroughly tested with RISC OS 3; supports saving of the desktop.

BACKGROUND

- The publisher, The Fourth Dimension, is the premiere specialist games house for the Archimedes with a string of classics dating back several years. *Cyber Chess* represents the latest in superb 3D simulations following on from great best-selling successes such as ***Chocks Away, Saloon Cars*** and ***Break 147 & Superpool.***
- The author, William Tunstall-Pedoe, has been developing commercial software for Acorn machines for nearly ten years including several high-quality Archimedes products. He has a First Class Honours degree in Computer Science from Cambridge University and spent over a year studying computer chess research in order to produce *Cyber Chess.* This project is by far his most substantial yet and was designed from the beginning to be the definitive chess-playing program for RISC OS machines.



Acorn A3000, A5000 & Archimedes Price £49.95

Please ring for details regarding Site Licences

The Fourth Dimension, 1 Percy Street, Sheffield, S3 8AU Tel. (0742) 700661 or 769950

SUPPORT FOR BEGINNERS/CHILDREN

- You can learn chess from scratch using *Cyber Chess* with the tutorial supplied.
- 100 beginner levels are provided going from 0 (very very weak) to 99 (reasonably competent). This encourages beginners/school chess players to continue playing by not demoralising them and allows them to monitor their progress as they begin to beat higher levels. When they beat level 99 they can graduate to 'full strength' mode.
- Teaching option shows you which moves are legal as you play.
- If a player gets stuck a hint can be requested.
- The names of the openings can be announced as they are played quickly familiarising chess learners with the various opening systems.

SUPPORT FOR STRONGER PLAYERS

- State-of-the-art chess algorithm.
- *Cyber Chess* can perform analysis, giving the best line of play from the current position and an estimate of who is winning/losing and by how much.
- Full tournament time controls (e.g. "40 moves in 2 hours and then all remaining in 1 hour") can be set up. Time controls can be set for human players as well as computer opponents to simulate real tournament conditions.
- State-of-the-art opening book supports opening traps and advice. Multiple books are provided and new ones can be added or existing ones edited.
- Even the style of computer play (defensive, attacking etc.) can be adjusted to taste or to prepare for a match against a similar human opponent.

A4 OK?

It's a name that's so good, you wonder why no other notebook computer manufacturer has used it before. The Acorn A4 is literally an A4-sized machine incorporating A5000 technology, and costing £1699 plus VAT. Now it is finally here, how good is it?

As exclusively revealed in *BAU* in May, the A4 looks remarkably similar to the Olivetti or Triumph-Adler Walkstation portable PC. But on the inside, being a fully-fledged Archimedes, it has more in common with an A5000.

It uses Olivetti's designer-look case. Made of tough polycarbonate and finished in a textured mid-grey epoxy, it really is exactly A4-sized. In the familiar portable mould, there's an LCD display housed in the flip-up lid, and an 83-key keyboard underneath. On the right edge there's a floppy disc drive, and the battery pack slides in to the left underneath the keyboard.

The lid opens with two slightly fiddly side catches, and hinges back to reveal the screen. It can't flop right back as there's a solid lip to stop it, but this does limit your choice of viewing angle a bit.

The screen is a passive-matrix LCD panel, 9in across, with a fluorescent edgelight, and capable of displaying up to 640 by 480 pixels in '16' shades of grey. The two thumbwheels on the lid alter the brightness of the edgelight and the overall contrast of the screen, to suit different lighting conditions. Above these are LEDs to show when the machine is on, whether power is coming from the mains or the battery, when the discs are being accessed, and so on. One nice feature is that these LEDs show from the outside of the case too, so you can tell if you've left the machine on by accident. It also beeps if you close the lid without switching off.

Round the back are two plastic covers. Behind the rear hatch is the socket for the mains adaptor, and you can plug in a normal desktop monitor and a parallel printer. On the side are headphone and serial ports, together with the mouse socket – the mouse supplied is the new Logitek curved design, on which opinion is divided. There's also a keyboard connector, so you can plug in a standard PC keyboard if necessary. Existing Archimedes mice and keyboards can be used too, though a couple of keys on the keyboard don't work as expected.

A major disadvantage of this arrangement is that both rear and side flaps have to be opened for normal use of the A4. And as with all portables, these flaps are vulnerable to the stresses of on-the-road life – they'll probably be the first bits to snap off. Also, the on switch is on the front edge below the space bar – just where it can be pushed accidentally whilst the A4 is packed away.

What is conspicuously missing from the A4 is a network connection and scope for internal expansion. Econet is not built-in as standard, and the A4 won't take a normal Econet board. Acorn says it is producing an Econet interface specially for the A4, but it also says that this will not be available straight away. And without any podule-style expansion, on-the-road desirables like an internal modem are unfortunately ruled out, as are back-at-home-base items like direct-drive laser printers, external disc drives or even Ethernet cards.



MALCOLM PIERS

First it was, then it wasn't, and here it is . . . At last Acorn has announced the A4 portable. Graham Bell gives his verdict

The A4's ready-to-go weight is a shade over 3kg – that's comparable with popular PC portables – though if you tote the mains adaptor and a spare battery too, the whole lot adds well over 4kg to your luggage.

INTERNAL HARDWARE

In hardware terms, the A4 is like an A5000, but built on a much smaller motherboard roughly half the size of a sheet of A4 paper. It contains a standard Arm3 microprocessor, along with the rest of the Arm chipset and a PC-style controller to look after the floppy and hard disc drives, parallel and serial ports. Risc OS 3 is standard. And there are two extra bits of hardware that don't appear in the A5000 – a separate processor to control the battery system, and a new LCD controller chip.

The Arm3 runs at 24MHz and the memory system runs at 12MHz, the same as in the A5000. The video system is clocked at 36MHz, which allows it to generate all the usual scree-

modes up to mode 31, at least via an external monitor.

To drive the LCD screen, Acorn has built its own LCD controller chip. This uses 'time-domain dithering' to generate the grey shades on screen – a fancy way of saying that to create a mid-grey, it flashes a pixel on and off. The more a pixel is on, the darker it looks, though it's too fast to see the flashing. The chip creates 16 – or in fact 15 – shades of grey, and the contrast range is good compared with many portable PC screens. It's limited to greyscaled mode 27 (640 x 480), or smaller modes like mode 12 (640 x 256) in letterbox format.

There are to be two variants of the A4: the more expensive one is fitted with 4Mb of Ram and both a high-density (1.6Mb) floppy drive and 60Mb hard disc. As with the A5000, the hard disc is a fairly fast Conner IDE drive, but of the small 2.5in size that can be fitted as an internal drive in an A3000. The base model sports only 2Mb of Ram, and permanent storage is limited to floppy disc.

Although an 'entry level' base model was not available for this preview, it is likely to be virtually unusable, except perhaps where you're using just one application all day (data logging for example). You cannot rely on a little pile of floppy discs on a moving train or on a school field trip. It is upgradable though: the hard drive and extra memory can be added later.

One of the key features of any portable is how long a battery charge lasts. While the Arm chip itself is known for its relatively low consumption, in reality it is the rest of the system that drinks the juice. Acorn hasn't gone to particularly special lengths to use static Ram or low-power support components, but some parts of the system do shut down when not needed.

The sound system has been redesigned to use only one-tenth of the power that the A5000 demands, and even the new Econet board will switch itself off if the network is not busy (or not plugged in). Acorn judges that the complexity of switching off the serial and parallel interfaces isn't worth the tiny power savings that can be made: the biggest gain lies in turning the hard disc and screen off during a period of inactivity, as they consume well over half the total power.

You can set how long it will be before they switch off with the Configure application, as the best delays will depend on your typical use of the machine. (It's not worth switching the disc drive off for less than a couple of minutes, because the extra current it draws while starting up again outweighs the savings that can be made in such a short time.)

POWER MANAGEMENT

The power management software also slows down the whole machine when you're not doing anything – again to conserve battery life. It does this by counting the number of Wimp idle events every second. If this comes to more than three-quarters of the maximum possible, then the machine isn't doing much else except idling, so it's safe to slow the Arm clock down from 24MHz to 6MHz, and the memory to 3MHz – this roughly quarters the power that's being used by the chips.



Subtle battery and power management keeps the A4 running

Events and interrupts boost the speed back up again. So if you're typing steadily, the machine is at full speed. But it slows down if you pause for more than a second or so. Getting up to make a cup of coffee will certainly slow it down, and after whatever delays you set, the screen will blank and hard disc will shut down too. You can, if you wish, switch them off immediately by pressing FN-F10.

The other side of the power equation is battery management. Tucked away on the front is a little LCD bargraph showing how much charge the battery has left. It is duplicated on the icon bar by the slightly tacky-looking *Battery* application. This lot is under the control of a separate battery management processor, which monitors power flowing out of the battery, or flowing in from the charger, and the voltage and temperature of the battery.

It can detect when a battery is fully charged, and switch the charging off. And it can keep track as the battery is discharged, displaying the remaining charge on the LCD display. When the battery is nearly empty, a warning appears on screen, so you can save your work safely. And if you don't respond to the warning, the machine attracts your attention by flashing the screen on and off.

Acorn claims that with all the power saving features working, you should get between 2.5 and 4 hours of use from a battery before you need to attach to the mains again. How realistic this is can't be judged until Acorn supplies a machine for a long-term test.

RISC OS 3

Risc OS 3 is standard on the A4, and it's a slightly later version than on current A5000s. All the Rom applications are included: *Draw, Paint, Edit* and the rest. And you get the remainder (like the printer drivers, *SciCalc, Maestro* and so on) on disc.

A5000 owners may have wondered what the empty fifth socket alongside their Risc OS 3 chips is for. The A4 contains this extra 'fifth column Rom', which adds extra modules to Risc OS – in this case the power management software. Patch modules could be added to the A5000 in the same way.

The set of upgrade Roms for Risc OS 2 machines has now been finalised, and will be available in a few months (see News, page 7).

IN USE

Switching on the A4 produces the usual Risc OS desktop. That's reassuring – despite its size, this *is* a real Archimedes. It will run pretty much everything, providing it doesn't need any podule hardware.

Almost everything looks cool and crisp on the LCD panel – it gives a very sharp mode 27 display in 15 shades of grey, but in common with all passive LCDs, it's hard to see from anything except head-on. Again, like all passive LCDs, scrolling text or animated graphics 'smear'. And most annoyingly, the mouse pointer simply disappears if you move it too fast. Occasionally, particular displays do cause some flickering – that's down to the way the greys are generated on the monochrome screen. Scanned sprites and some dithered patterns are the main culprits.

Thankfully, the A4 lacks the all-but-unusable touchpad mouse-controller of the WalkStation. You can use the cursor keys and a new Function key on the keyboard to emulate a mouse, or plug in a real mouse if you've got one handy. The keyboard idea works – right hand ALT plus the arrow keys for moving the pointer, left hand FN plus 1, 2 and 3 for the buttons. But it's not the way you'd want to use the machine: it takes practice and some dexterity (how good were you at *Planetoid*?). On a portable, learning the CTRL-key shortcuts (like F3 for save) becomes vital. All the more pity that many applications eschew them.

The rest of the keyboard is pure PC: that means that CAPS LOCK and CTRL are switched round, for example, and there's no dedicated F11 or F12 – you have to use FN-F1 and FN-F2 instead. Keys like PAGE UP and HOME are all there, tucked into the right-hand side and marked rather cryptically. But instead of the numeric keypad, the area around J, K and L does double service with the FN key. Typing can become a many-fingered exercise (SHIFT-CTRL-FN-F1 zooms in on an *Impression* page, ALT-FN-2-1-5 enters a multiplication sign), but the keyboard has a fairly good feel for touch-typists.

Compatibility of applications isn't really an issue with the A4. It runs pretty much everything, and at about A5000 speed too. One or two applications don't get on with Risc OS 3, but the major problem is one of colours: where some colours contrast, their greyscale equivalents can look similar, so it's difficult to pick out some supposedly-prominent features. *Lemmings* is an example – you can't see the 'green' grey cursor crosshairs against the 'light brown' grey background. But most commercial applications have been designed with the use of a greyscale palette in mind.

As you work, the *Battery* application may warn you you're about to run out of battery power. At this point, you can keep going by plugging in the mains adapter, which also charges the battery in the machine. Or you can shutdown and switch off.

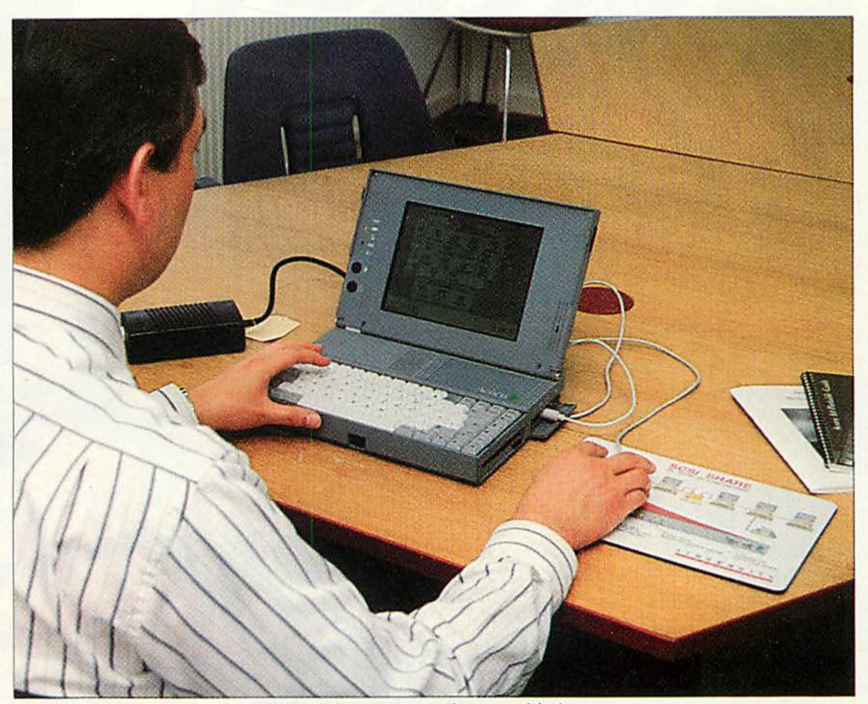
THE BOTTOM LINE

So how does Acorn's first portable stack up? There's no doubt it is a real Archimedes – an A5000 you can carry around. Technically, that's quite a feat. And it's an eminently usable machine. The weight, screen and battery life are up there with the better PC portables and the Mac Powerbook.

Acorn has put immense effort into cramming everything in, and into power conservation. But there are a number of areas where extra attention could have turned the A4 into an outstanding machine.

Trivial matters like the keyboard layout – CAPS LOCK and CTRL don't match other Archimedes keyboards – and the vulnerable rear flaps combine with more serious drawbacks like the lack of built-in networking and the need to carry around a mouse. And while PC portables are often bundled with some link to your desktop machine to make file transfer easy, Acorn is clearly relying on someone else to supply this increasingly vital widget.

Technically, Acorn has shown it can design a competent portable, without compromising the useability of Risc OS too much. For those already wedded to Risc OS, it's a very desirable machine. But the lack of expansion could rule it out of the home market. Acorn cites 'concerned parents' as a key educational sales target, tacitly accepting that the A4 is too expensive for schools to afford in large numbers. The professional and business market is one where portables are often second machines, so PC compatibility is important. You can run the emulator . . . but real PC portables are considerably cheaper.


Despite its small size – A4 is a literal description – the portable is a true Arc

PRODUCT DETAILS

Product: Acorn A4 portable
Supplier: Acorn Computers, Fulbourn Road, Cherry Hinton, Cambridge CB1 4JN. Tel: (0223) 245200.
Price: £1699 plus VAT (entry level model £1399 plus VAT). Educational discounts available
Availability: Limited supplies now available. Full-scale supplies from September

THE COMPETITION

Acorn deliberately compares the A4 with the Apple Powerbook 170, claiming similar performance for about half the price. This is misleading. A good chunk of that price is accounted for by the active-matrix LCD fitted to the 170, and that leaves the A4's display for dead.

The Powerbook 140 is a better comparison, as the screen is of similar quality. There the price differential is not so great. Apple quite clearly has a better solution to the need for a mouse – a trackball built into the keyboard. The Powerbook can also have an internal fax-modem fitted, it comes with a microphone, and you can plug it straight in to an existing network. On the downside, the Powerbook is more expensive and a gram or two heavier, battery life is generally less than that of the A4, and in the past there have been some reliability problems reported with Powerbooks.

Ironically, the A4 is a wonderful first computer for business. But the PC world is currently awash with portables, and you can get a good 386 portable with hard disc for £1000 – without having to buy from the equivalent of Lada or Yugo. There is no doubt that Acorn cannot sell its machines as cheaply, despite using many of the same components, and what business can afford to ignore that?

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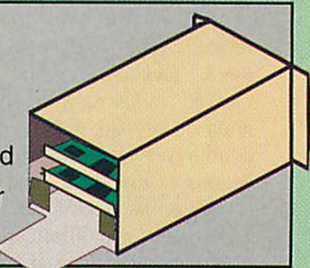
3

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NEW WORLDS

Fin Fahey takes a trip around the Solar System with Spacetech's new image processor

Life on the final frontier doesn't look too great at the moment. There have been extensive budget cuts at Nasa, resulting in the loss of some important projects, including the CRAF (Comet Rendezvous – Asteroid Flyby), the first really close look we would have had at the surface of a comet. The Soviet program has, inevitably, sunk out of sight and the European Space Agency has been hit by the side effects of German reunification. A number of disasters, including the defective mirror on the Hubble Space Telescope, and the probable loss of most of the data from Nasa's Jupiter probe, Galileo, due to the failure of its high-gain antenna, complete a picture of gloom.

It's cheering for us space cadets, therefore, to be reminded of the triumphs that have been achieved in the past few decades, often against the odds. Such amazing missions as the Voyagers to the outer planets; Mariner and Viking at Mars; Pioneer, Venera and Magellan at Venus, have all not merely succeeded, but have usually surpassed their original specifications.

Spacetech, a Dorset-based software house, is doing its bit to help. It has released *PDSview* which, although billed as a general-purpose image processor, gives easy access to the myriad of images that Nasa has released on CD-Rom as part of its 14-disc, (and counting) Planetary Data System (PDS).

PDSview is a fully Risc OS-compliant system that allows you to apply a number of different transformations to raw image data. It is not confined in its use to Nasa images, but is well-adapted to Nasa's standard file format. Besides *PDSview*, an application called *PDSmovies* is included to allow a series of different images to be combined into an animation.

Both the above applications, not surprisingly for graphics manipulatiors, are very memory-hungry, particularly *PDSmovies*, so the prospective user is advised to start with at least 4Mb of Ram installed. Even then, I found that some images, particularly those in colour, where three separate red, green and blue images are combined, wouldn't load. Short of boosting the

memory, the only solution in many cases is to cut the image down to a smaller sprite.

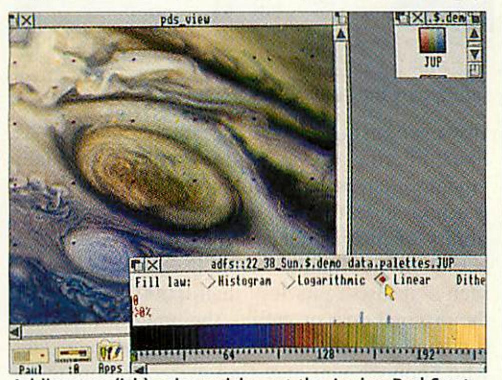
The system comes on two discs, one containing the modules and a 'test card' and one with a series of sample images – useful if you haven't yet got the CDs. Images and palettes are loaded by dragging them onto the *PDSview* icon on the bar, or into an existing image frame. Nasa's valuable label files can be viewed from a Menu option on the main icon.

PROCESSING

Unless you are using a graphics enhancer, the best way to view an image initially is as a 16-colour greyscale, although *PDSview* is compatible with the 256-greyscale PCATS board, which will give you a true representation of the images (this is also available from Spacetech). However, dithering can be selected to extend the range of shades. If you wish to add a false colour palette, of course, all 256 colours are available.

A wide variety of options, varying in power, are available from the Menu button once the image has been loaded. One process however, is indispensable before you do anything, and this is to maximise the contrast in the picture. In many cases, for example, the 'underexposed' pictures of the Uranian moons, the pixel values are clustered at the dark end of the palette and literally nothing is visible in the image. Three non-destructive (reversible) fill options are available for this from the palette menu. The default, Linear spreads the palette evenly, Logarithmic concentrates grey levels towards the end of the range, lightening dark images, and histogram concentrates grey levels where most of the data is.

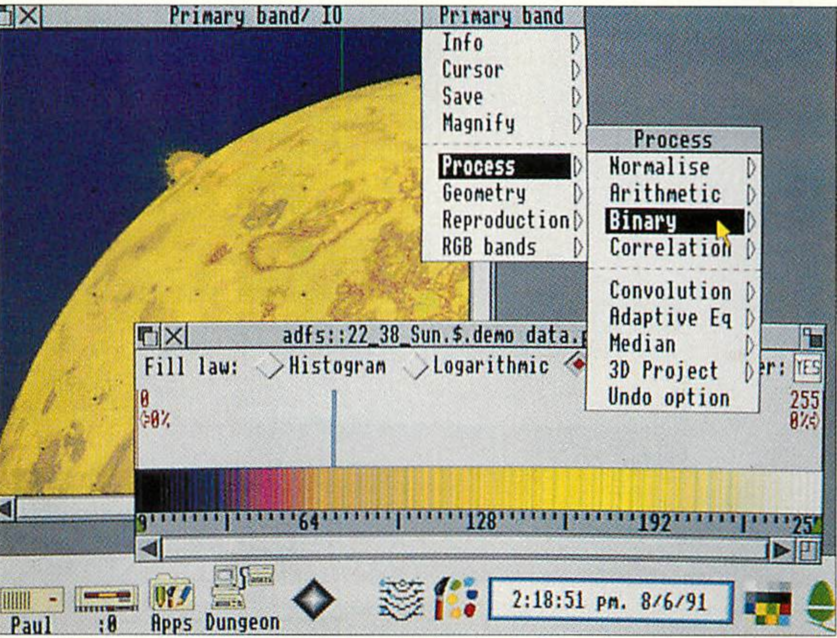
These options may not necessarily help, so 'normalisation' is needed. This means simply telling the system what limits you consider to be important for the image data, so that it can spread its grey scale over these values, clipping off the rest. To help with this, the palette displays a histogram, and it's then a simple matter of dragging the limit markers around the concentration of data you want. Going back to the menu and selecting Normalise sets the process in train - it's irreversible, and you should now have a clearer image.



Adding true(ish) colour picks out the Jovian Red Spot

Once there's something to look at, more sophisticated processing can be undertaken. The most familiar of these is 'convolution' (see the article on image processing in *BAU* June 1990). Since this is destructive when applied to the whole image, you can try out different convolutions on a selected part of the image by hitting Adjust, without losing data. This also lets you zoom in on the selected area to view the result. Convolution is essentially a scan of all the pixels in the image, adjusting the level of each one depending on the values of its neighbours. It therefore can be a little slow on some systems, but on an A540 is almost instantaneous.

The easiest convolution algorithm to understand is edge detection. Patently, a pixel that is part of a vertical edge will have contrasting



An active volcano on Jupiter's moon, Io, shown up by use of a false colour palette

WHY PROCESS?

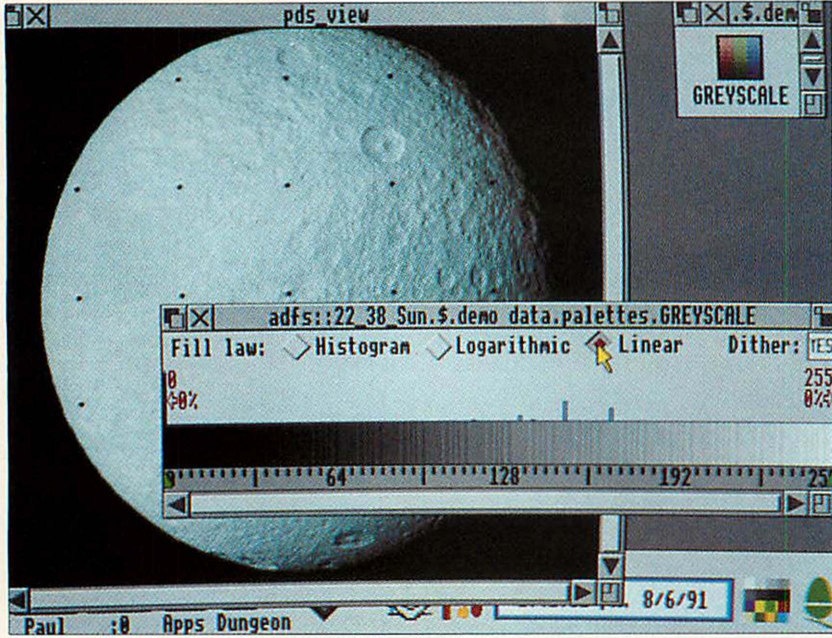
Before it pops up in the mass media, an image from a satellite or space probe has almost always been heavily processed, at least since cheap computer power became available. On the rare occasions this hasn't happened, the results have usually been quite incomprehensible. I'm thinking here of the BBC's coverage of the Giotto encounter with Halley's Comet, where presenter James Burke and audience alike seemed completely baffled by the psychedelic and chaotic 'real-time' images on their screens. Yet, within a few weeks, this ugly duckling data had been turned into a perfect series of shots showing Halley as a dark knobbly object emanating bright, well-defined, jets of gas and dust.

Spacecraft image data, coming as it does from a variety of missions undertaken under a range of conditions, is heavily non-standard, which is one reason why image processing is necessary in the first place. Some common factors make life easier, however. One is that whatever the resolution of a picture, no more than eight bits are ever needed to describe one image pixel, although some earlier missions have made do with less. Obviously a byte-based schema makes life a lot easier for an image processor.

On the other hand, other factors can vary a lot. Not all images are in visible light – indeed in some cases, for example Magellan, the results are radar echoes and the 'pixels' represent altitude, not reflected radiation. Most planetary images are not in colour, which may surprise many who have seen the extraordinary films put together from the Voyager encounters. Instead, these spacecraft took a series of mono shots using different coloured filters dropped over the camera. These can then be recombined back on Earth to give a colour result. Obviously some image processing is needed here – a flyby probe, especially Voyager, is a fast-moving platform, so each of the images is taken from a slightly different viewpoint. This source of distortion becomes even more important further out from the Sun, and was at its worst at Neptune, since long exposure times were needed in the low lighting.

The latter factor even affected monochrome imaging at Uranus and Neptune, when the spacecraft's camera platform had to be slewed to keep the target centred. The result is a motion blur on the image, which can be dealt with by using a convolution algorithm to sharpen the image.

Getting back to colour, there are many cases when visible light alone isn't imaged, for example on many Spot and Landsat images of the Earth which include an infra red band (particularly well adapted to show vegetation). In this case the addition of 'false colour' by image processing helps to make the image comprehensible to the human eye.



Dithering gives the effect of 256 grey shades on a 16-colour screen

THE PLANETARY DATA SYSTEM

The PDS consists of a series of CDs containing not merely raw imaging data from a number of planetary missions, but earth resources and weather satellite images, star catalogues, and records of non-image data such as 'fields and particles' experiments mounted on a variety of spacecraft. The last are unspectacular to the non-specialist, but constitute a valuable set of records of everything from solar proton flux since the 1960s to gamma-ray 'maps' of the Moon's surface. A range of this data is available on the first two PDS volumes, the Space Science Samplers, the first one of which is an in-depth collection of data gained during Voyager 2's encounter with Uranus in 1986, the second of which covers a variety of encounters, including the Voyagers at Jupiter and Saturn, Viking images of Phobos and a variety of NOAA and Landsat images of the Earth.

PDSview is concerned with easy access to this imaging data. Nasa's worthy aim was to design common data structures (the space research equivalent of TIFF files) to facilitate the easy circulation of this inormation. For imaging files, there are three components to this: the raw image; a palette describing the colours assigned to the image; and a label which can be either attached to the image or reside as a separate file. *PDSview* allows the user to view or manipulate each of these.

At the moment, PDS discs available include the two space science samplers which I used to review the system, plus a 12-disc set of Voyager outer-planet data, covering Saturn, Jupiter, Uranus and Neptune.

pixels left and right of it. The specification for scanning the nine-pixel block centred on the target pixel is known as the 'kernel', and a number of preset kernels are provided, including sharpening, softening and general-purpose edge detection. For example, sharpening helps with poor focus or camera slew, while softening a picture helps to remove unwanted 'blips' of noise. Four other kernels can be configured by the user – one use of these could be to maximise contrast across a specific axis, for example to detect vertical edges.

A more difficult technique, and one that makes more demands on computing power, is adaptive equalisation. This spreads its net wider across the image and maximises detail in areas that may not show any. Median filtering is another noise reduction technique which clips unwanted grey levels towards the centre of the scale.

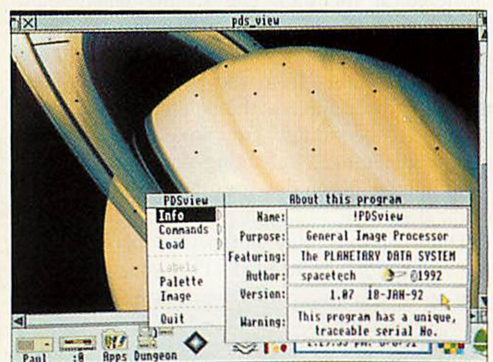
The final destructive option is 3D projection. This is a nice touch, buts gives meaningless results for most images. However for images that represent altitude, such as those from the synthetic aperture radar used on Magellan and some earth satellites like ERS-1, this will give a relief map of the terrain shown.

Besides the destructive processes, non-destructive processes can be undertaken, often using the 'secondary bands' designated as red, green and blue. Using simple arithmetic, all pixels in the image can be altered according to a user-specified equation. Binary processes mean that the image can be logically combined in various ways with one of the secondary images, and Correlation highlights the differences between the primary and a secondary image.

The main use of the sidebands, however, is in processing RGB images, in which case they function as 'bitplanes' that can be combined to give true colour using the Composite option, or those images that have multi-spectral sidebands, (e.g. in infra red), in which case a meaningful 'false colour' image can be constructed.

STAYING SHARP

PDSview is a compliant and easy to use package that makes full use of the Arc's speed. There's no reason why, for those users who wish to stay closer to Earth, that it cannot be used to process received images that users have downloaded to their hard discs, whether from earth-observing satellites or other sources.



Saturn gets the PDSview treatment

However, using *PDSview* without the PDS is like ordering a pilau rice without a lamb vindaloo, cucumber raitha or mango chutney. It is impossible to find fault with this excellent library of images, and 14 discs for around £200 has to be one of the best CD-Rom prices I've seen – it also costs less than 0.0001 percent of the original cost of getting the images. PDS is a fundamental part of our cultural heritage, and who knows – you may find something out there no-one else has noticed!

Besides its value for space researchers and earth-satellite users, *PDSview* will surely find a place in education as part of a project combining computing, imaging, astronomy and physics.

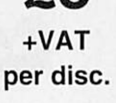
PRODUCT DETAILS

Product: PDSView image processor
Supplier: Spacetech, 21 West Wools, Portland, Dorset DT5 2EA
Tel: (0305) 822753
Prices: PDSview – £99.50 (site licence – £150)
PDS CD-Roms: 2-disc sampler – £20.00
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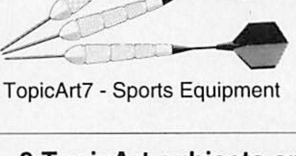



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A printing utility which allows you to print Draw or Sprite files at any size using any printer. The user simply loads the required draw or sprite file into Tiler specifying the size of poster required, using a preset paper size, ie. A2, A0 etc, or as a percentage of the original size or in physical dimensions, ie millimetres. The document will then be increased or decreased in size automatically and printed over several pages with crop marks provided on each page to assist cutting/overlapping.

Limited Special Offer 4 only A5000 4Mb 2MHD LC Base Units (No monitor) £1249 each

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LEARNING CURVE SYSTEM with Multi Scan Monitor, Acorn DTP, 1st Word+, Genesis+, PC Emulator, Pacmania, etc.

A5000 2MHDLCP £1759
LEARNING CRV PRINTER SYSTEM Including Acorn JP-150 Ink Jet Printer

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As above with Monitor £789
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LEARNING CURVE with 1st Word+, Genesis+, PC Emulator, Lemmings, Pacmania, introductory video etc.
As above with Monitor £829
BBC A3000 LCP £1089
LEARNING CRV PRINTER SYSTEM Including Acorn JP-150 Ink Jet Printer
BBC A3000 £679
SPECIAL ACCESS
As above with Monitor £869

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Up to 2Mb RAM	£45
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A5000	
Up to 4Mb RAM	£95
A400 RAM	£39 per Mb
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ARM3	£185
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FaxPack (CC)	£289
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ScanLight A4	£289
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VIDC Enhancer	£27
Vision Digitiser Archi	£49
Vision Digitiser A3000 Int £49/Ext £62	

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Hard Discs

The following are complete hard disc systems comprising of interface, hard disc, mounting bracket, cables, utilities disc & guide.

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520Mb 12ms Cache	£999
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20Mb	£199
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520Mb 12ms Cache	£1049
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180Mb 18ms Cache	£699
(Add £30 for Archimedes External)	

Printers (Inc Cable/Driver)

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Canon BJ-10 ASF	£49
Canon BJ-20	£289
Canon BJ-300	£339
Canon BJ-300 ASF	£99
Canon BJ-330	£399
Citizen Swift 24e	£235
HP DeskJet 500	£329
HP DeskJet 500C Colour	£499
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Laser Direct HiRes4	£999
Laser Direct HiRes8	£1319

Printer Consumables

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BJ-300 Ink Cartridge	£13
DeskJet 500 Ink Cartridge	£15
DeskJet 500 Hi-Cap Ink Cartridge	£21
DeskJet 500C Colour Cartridge	£27
LBP-4 Toner	£65
Swift 24 Mono Ribbon	£5
Swift 24 Colour Ribbon	£15

Books (No VAT)

Acorn Education Directory	£4.95
Dabs Archi Assembly Lang	£14.95
Dabs Archi First Steps	£9.95
Dabs Archi Operating System	£14.95
Dabs Mastering 1st Word+	£13.95
A3000 Technical Guide	£29.95
A540/A5000 Tech Guide (ea)	£65.00
Basic V: A Dabhand Guide	£9.95
BBC Basic Guide (Acorn)	£19.95
RISCOS PRM's	£79.00
RISCOS Style Guide	£9.95
1st Word+ Manual (Acorn)	£10.00
Acorn DTP Manual (Acorn)	£10.00
AASM Manual (Acorn)	£25.00
ANSI C v4 Manual (Acorn)	£25.00
First Impressions	£30.00
Good Impressions	£32.00

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NEXT MONTH

BBC ACORN USER

WHAT IS IT REALLY LIKE INSIDE ARM?

Arm Ltd, the company formed by Acorn, Apple and VLSI Technology, is at the forefront of chip development. So what goes on behind the doors of the Cambridge-based company? Don't miss our report in next month's issue

ART FOR ART'S SAKE?

The Archimedes is renowned for its graphics capabilities. We look at how artist Pete Worrall creates state-of-the-art images of the highest quality

SOUND OUT

David Radford concludes his series on the sound capabilities of the Archimedes by rounding up many of the elements discussed in previous articles. He tells users how to further develop their sound-making techniques

PLUS

EUREKA READY?

At the time of going to press, Longman Logotron was promising us an early version of the long-awaited *Eureka* spreadsheet package. Watch out for our special sneak preview

FAMILY HISTORY

With an increasing number of people looking into their family history, we look at a number of packages which take the slog out of plundering the archives

BETTER NETWORKING

If you run a network, or are thinking of setting one up, we have some advice on the best networking solutions

REGULARS

- All the latest news and views from the world of Acorn
- *INFO – helpful advice and ideas covering the BBC A3000, Archimedes, A5000, BBC B and Master
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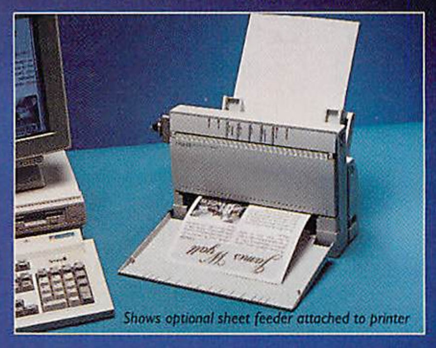
THE DRIVING FORCE

Winner of the Best Printer in the recent Computer Shopper Awards, the Cannon BJ10ex printer has revolutionised the small printer market. It offers 360 dpi, near laser printer quality, on plain A4 paper, in an incredibly compact and lightweight housing. Unfortunately the existing RISC OS printer drivers, based on the standard Acorn drivers, have definitely been in the slow lane, locking your computer up for the entire print process, often up to ten minutes per page.

Computer Concepts have now created a set of RISCOS printer drivers, called TurboDrivers, that are optimised for the Cannon BJ10ex printer. The result is the perfect combination of budget printer and RISCOS printer driver, able to print full 360 dpi high resolution pages at a quality superior to that available from any dot matrix printer.

The TurboDrivers not only print the pages faster, but give control back sooner - up to ten times quicker. The table shows the time taken to print and the time the computer is occupied for some typical example pages.




Shows optional sheet feeder attached to printer

The TurboDrivers print faster on an ARM2 machine than traditional drivers on an ARM3 machine. In addition they can send the print data to disc and then print from disc in the background, so the computer and almost all memory remains free for other uses, while the printer gets on with printing.

	Standard Driver	TurboDriver	
	Time to complete	Time to complete	Time to get control back
A complex page of text & graphics	521 seconds	199 seconds	70 seconds
2 pages text in different fonts	753 seconds	283 seconds	64 seconds
One complex page from !Draw	643 seconds	261 seconds	187 seconds

All times in seconds from a standard ARM2 Archimedes with 4MBytes RAM and hard disc. Times would be faster for an ARM3 based machine.



BJ10ex printer & drivers £249.00 + VAT (£292.57) + p&p. Optional 30 sheet feeder £48.00 + VAT (£56.40)
TurboDriver software & printer cable £49.00 + VAT (£57.57)

Compatible with all applications that use the RISC OS printer drivers and all Archimedes models.

Computer Concepts Ltd

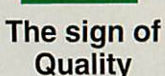
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Archimedes micro

System	Basic	Mono	Colour	Multiscan
A540/1	£2495	£2555	£2655	£2815
A3000	£599	£665	£759	£924
A3000L/C	£642	£708	£802	£967
A5000H/D	–	–	–	£1499
A5000L/C	–	–	–	£1531

Unbeatable Sale Offers on Archimedes Micro

When you purchase an Archimedes Micro from Watford, look what you get FREE with it

Micro	Free Offer
A540/1	Multiscan monitor with VIDC enhancer and LC20 Printer
A3000	2Mb RAM; Monitor plinth and Acorn's A3000 Shoulder Bag (carrying case)
A5000	Upgraded to 4Mb RAM

A5000 Hard Disc Drives

- A5000 – 100Mb 18mS Hard Disc Upgrade £269
- A5000 – 210Mb 18mS Hard Disc Upgrade £459

Archi Accessories

- 3.5" 800K 2nd Floppy Drive (305/310) £118
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- MIDI Expansion Card £65
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- Dual RS232 Podule £195
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- Archi replacement mouse – New design £32
- PC Emulator v1.7 £85
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- 4 Podule Backplane £25
- Fan for above backplanes £8
- Risc Os Extras Software Disc £5
- Ethernet Card £220
- SCSI Card 8 bit £129
- A5000 – 2 to 4Mb RAM Upgrade £92

A3000 Accessories

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- Monitor Stand £15
- Technical Manual £39
- Serial Upgrade £19
- A3000 Dust Cover £5
- A3000 plus Monitor Dust Cover £9
- A3000 User Port/Midi Upgrade Card £44
- A3000 User/Analogue/IIC I/O Card £42
- A3000 External Podule Case £15



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Archimedes Hard Disc

Watford's ST506 Hard disc drives for A310 & A410 series fit internally into the space provided.
P.S. A310 upgrades require a backplane and a fan.

- **3HDP** – Hard Disc Podule only £99
- **3HD20** – 20Meg H' Disc + Podule for 310 £195
- **3HD40** – 40Meg H' Disc + Podule for 310 £285
- **3HD50** – 53Meg H' Disc + Podule for 310 £359
- **4HD20** – 20Meg Hard Disc for 410 £69
- **4HD40** – 40Meg Hard Disc for 410 £195
- **4HD50** – 53Meg Hard Disc for 410 £260
- A3000 20Meg Hard Disc + Podule £279
- A3000 40Meg Hard Disc + Podule £379

Archimedes A3000 Desk Top Publishing (DTP) Sale Offer

A3000 BBC Archimedes Micro with 3.5" Floppy Disc Drive and a mouse, upgraded to 2Mb RAM, COLOUR Monitor + Lead, 20Mb fast IDE Hard Disc Drive, 'Compression' Utility to increase the Hard Drive capacity to Typically 40Mb, The highly acclaimed Computer Concept's Impression Junior DTP software package.

RRP: £1299

Sale Offer Price: £875

Above Package plus Acorn's Learning Curve **£918**

NEW DTP Package as above but with a 30Mb fast IDE Drive, (with Compression utility, the capacity is increased to typically 60Mb) **£899**

Above package with Acorn's Learning Curve **£942**

Special Education discounts available on above package, micros, RAM upgrades, ARM 3 Turbo Card, etc. Please write in or telephone:
(0923) 237774/250335

Archimedes RAM Upgrade

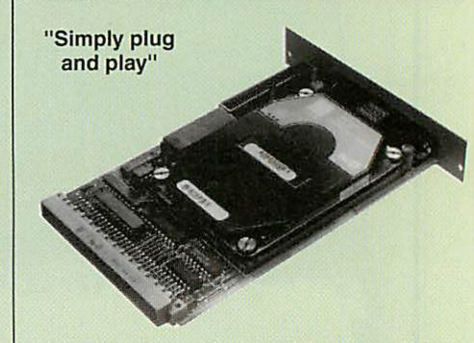
All our memory upgrades are simple to fit. No soldering required. Fitting instructions supplied.

- **R300**-4 Layer RAM upgrade board (Bare). £25
- **R302**-A3000 – to 2MB RAM Upgrade £36
- **R303**-A3000 – to 2MB RAM Upgrade (expandable to 4MB) £55
- **R304**-A3000 – to 4MB RAM Upgrade £125
- **R311**-A305 – to 1MB RAM Upgrade £30
- **R312**-A305/310 – to 2MB RAM Upgrade £149
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0% Finance & Special Teachers/Academics' prices Now available on A3000L/C and A5000 L/C Micro Systems

Archi IDE Hard Cards

"Simply plug and play"



Watford's NEW low cost, high performance revolutionary IDE Hard Cards for the A300 and A400 series Archimedes are unbelievably easy to install – you simply slot one into any vacant podule backplane slot in the rear of your computer. These stunningly engineered, light weight but fast, 2.5" miniature hard drives are mounted onto the professionally designed cards, and are supplied with the fully Acorn-conformant IDE Filing System ready installed and ready to run. A novel feature of the hard cards is that they can be easily removed and transported to another Archimedes, for example to make a hard disc backup, or to transfer saved files from work to home etc. Security of files on the hard disc is ensured by our unique security password lock, which allows files to be read only, but not overwritten or deleted – ideal for use in school applications where the integrity of your master software needs to be retained.

ADA 0650	21Mb	23mS	**£199**
ADA 0800	30Mb	19mS	**£295**
ADA 0660	44Mb	28mS	**£359**
ADA 0810	60Mb	18mS	**£409**
ADA 0670	89Mb	18mS	**£629**

(Can be used as a Removable Hard Drive)

NEW Archimedes A300/A400 SCSI Hard Disc Offer

(while stocks last)

100MB Hard Disc Upgrade complete with Controller card, Cables, Formatter and Manuals

RRP: £999

Offer Price: £339

Syquest Removable Disc Units

These Hard Drive units are supplied complete with a cartridge 42Mb removable, cables and a high flow fan for cooling.

- Syquest Drive Unit pack £399
- As above + SCSI Card £535
- Spare 42Mb Disc £55

Hi-Speed, Low Cost Archi Hard Disc Drive

Watford's advanced interface allows IDE drives to work on any Archimedes machine, speeds in excess of SCSI devices can be obtained at a fraction of the cost of a SCSI drive.

Up to four drives are supported by the IDE filing system IDEFS, up to two drives can be attached to each expansion card, up to four cards can be installed in a machine. An optional 20Mb or 40Mb hard disc can be supplied on the podule expansion card itself, with its fast transfer rate and power saving modes the drive is ideal for storing commonly used software such as the !Fonts application.

A powerful security feature has been provided with the two unique commands *IDELock and *IDEUnlock, ideal for educational establishments where hacking or tempering may be prevalent that may lead to loss of data. Once locked, the configuration can not be changed until a secret password is used. The !IDEForm Write Protect option is particularly useful in conjunction with *IDELock as it will prevent any unauthorised deletion of data.

By an innovative use of on-board memory, the card will remember its configuration, even if moved to another slot or even a different machine, this also includes the unique security features.

Hardware

- Single width EuroCard
- Supports proposed ANSI ATA (IDE) specification
- Fast 16 bit MEMC interface interrupt driven to support background disc operations
- 5 Mbytes per second peak transfer rate
- Built in Non Volatile RAM to hold configuration
- LED activity indicator
- 37 way D type socket for external drives
- Optional on-card 20Mb or 40Mb hard disc
- Up to two drives (master and slave) per card
- Multiple cards per machine (up to four)

Software

- Conforms fully to the Acorn IDE Specification
- All software supplied in ROM
- Filing system 'IDEFS'
- Desktop filer with drive ready detection and disc name under icon
- !IDEForm, WIMP based configuration and formatting software
- Drives can be individually write protected
- Up to four drives over multiple cards
- Power saving standby modes supported with configurable timeout
- Drives can be used without translation in native mode for minimum overhead
- !IDEFSDisk, creates PC emulator hard discs

Prices

Part No.	Capacity	Access Speed	Price
ADA 0520	44Mb	28mS	£215
ADA 0530	100Mb	16mS	£295
ADA 0570	200Mb	15mS	£479
ADA 0580	330Mb	15mS	£849

All the above 3.5" hard drives are supplied complete with Controller Card, cable & Software on ROM. (Internal fitting). For use with A300/A400/A500 series machines.

For A3000 users an additional external Case and PSU will be required.

AAA 0300 External Case & PSU for A3000 **£85**

Internal Hard Disc Drives for A3000

State of the art, 4 layer internal IDE Hard Cards for the A3000. Software supplied in, On-board ROM.

ADA 0700	21Mb	23mS	£185
ADA 0770	30Mb	19mS	£285
ADA 0720	44Mb	19mS	£349
ADA 0750	60MB	18MS	£399
ADA 0730	89Mb	18mS	£619

Supplied ready assembled. No soldering required. Simply plug into the alloted space.

A3000 users will require External Case and Power Supply £85

or A3000 Ultimum Expansion System **£149**

Lease Purchase facility now available. Please telephone or write in for details.

Silicon Vision

Data Vision	£110	Solids Render	£120
Graphic Development	£40	Share Holder	£135
Realtime Graphics	£75	Super Dump	£22
RISC BASIC	£119	3D Graphic Development	£40
RISC FORTH	£119		

Desk Top Publishers

Acorn's Archi DTP Package	**£99**
• Equasor £39; • Expression-PS	**£19**
Impression 2 DTP Pack	**£125**
Impression Junior	**£69**
Impression Business Supplement	**£39**
Impression II Borders Disc	**£19**
Tempest DTP Package	**£90**

Archi Wordprocessors

Pendown Archi	£48	1st Word Plus – 2	£63
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AlphaBase	£36	Magpie	£40
Flexifile	£79	Multistore v2.01	£176
Knowledge Organiser	£42	Pinpoint	£65

Spreadsheets

Intersheet Disc	£24	Schema	£89
Viewsheet	£45		

Business Graphics

GammaPlot	£39	Sigmaplot	£39
Interchart Disc	£17		

Integrated Packages

- Pipedream 4 **£149**
- Desktop Office – Database, Graphs & Charts, Wordprocessor Spreadsheet, Communications **£98**
- Desktop Folio – Wordprocessor, Desktop & Interactive Publishing. Ideal for school **£75**

A3000 I/O Card (User, Analogue & IIC)

This NEW versatile I/O Card from Watford, fits inside the A3000 and includes an Analog to Digital Converter, a User Port, and an InterIC (IIC) connector.

The card allows many of the peripherals developed for the BBC to be used with the Archimedes A3000. The ADC and User Port have the same pin out and connectors as the BBC computers.

Extensive RISC OS software is supplied to provide BBC OSBYTE calls for support of the ADC and User Ports, including the BASIC keyword ADVAL. The software provides extended RISC OS support for separate interrupts from both the ADC and User Ports, permitting easy interrupt driven operation.

The card is provided with all the software in ROM and is automatically loaded when the machine is turned on.

Peripherals connected to the ports can obtain up to 500mA of power at +5V. A fuse is fitted to the card to protect the A3000 from damage arising from accidental short circuit of the power output.

The card is provided with an extensive manual explaining installation, all software commands, connector pin outs, hardware addresses and example programs.

Features

- An 8 bit User Port with a standard 20 way IDC connector, compatible with the User Port on the BBC computers and the Archimedes I/O Podule.
- A 10 bit Analog to Digital Converter with a standard 15 way D type connector, compatible with the ADC on the BBC range of computers and the Archimedes I/O podule.
- An InterIC (IIC) Port with a 5 pin DIN socket to connect the A3000 to external IIC devices.

£42

More Archimedes Products See Pages 3, 5, 6, 8, 10, 13



256 Grey-Scale Scanner



Arguably, The Best Hand Scanner for the Archimedes

Watford proudly introduces its new innovative 256 grey-level hand scanner for the Archimedes range of micro computers. It offers up to 256 grey levels at a maximum of 400 dpi, and comes complete with the most advanced and sophisticated 256 grey scale scanner software currently available for the Archimedes.

Designed by our own R & D team, it offers the best overall scanning solution for incorporating pre-drawn logos, artwork, photographs and sketches into desktop publishing documents and other graphics programs, including !Paint etc.

The scanner has been openly welcomed by the computer press.

"The image quality which this little beauty can produce is quite stunning" – Archimedes World – July 1992.

"Other Arch image grabbers have been irritating or just plain useless".

"Loads of well written, easy-to-follow and in-depth help, all glued together in a very handsomely designed manual." – Computer Shopper – July 1992.

The major features of the package are:

Multiple copies of the image in memory at once, allows multiple consecutive operations without having to save the original image to disk.

Instant redraw of all 4 image buffers. No re-calculations needed unlike other packages that use on the fly screen-dithering.

High advanced dithering and image size reduction available via industry standard ChangeFSI package for maximum image quality. An invaluable aid to reduce the size of the image whilst maintaining image quality.

A unique LED indicator on the scanner shows you when the scanner is being moved at close to the maximum scanning speed, not just when it is too late and a scan line has been missed by moving the scanner too fast.

Fully adjustable scale and size of image preview when scanning. Image preview window can even be behind other windows and preview is shown in real-time with maximum number of grey-scales available.

Support for Serial Port Graphics Enhancer. Allows up to 256 simultaneous grey scales on screen at once.

True brightness, contrast and gamma correction. All can be specified by a value to exactly match monitor/printer. No guessing with shapes of curves.

RISC OS 3 features include rotation and shearing. Scans normally are scanned at a slant rather than being rotated, shearing enables the scan to be corrected better than rotation.

Scanner scans at an amazing 3ms per line. A post card at 400 dpi takes only 7.3 seconds to scan, creating over 3Mb of data.

Selectable 256 grey-scale, 256 grey-scale half width, 16 grey-scale and monochrome scanning modes. Half width mode enables longer 256 grey-scale scans to be achieved.

Fast RISC OS printing with multiple options.

Save image in AIM, TIFF or RISC OS Sprite format.

Advanced in-built image processing options.

Convolution digital filtering fully implemented with over 100 filters covering edge detection, image enhancement and image smoothing.

Single width, high quality podule using surface mount technology.

Just compare the competition on our price and above features. There can only be one choice.

Continued→ → → → → → → → → →

ULTIMUM – Archimedes A3000 Podule Racking System



THE ONLY LOGICAL WAY TO EXPAND YOUR A3000 COMPUTER

Price: £149

Minerva's Archimedes Software

EasyWord	£18	Mailshot*	£27
Home Accounts	£35	Reporter*	£27
Time Tabler	£549	School Admin*	£65
System Delta	£59		

System Delta Program Reference Manual £29

** Requires System Delta to operate*

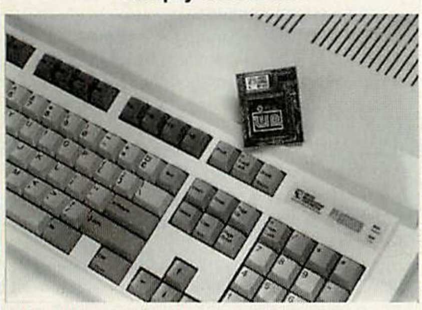
Stand alone Business Accounts Packages
Sales; Purchase; Order Processing and Invoicing; Nominal; Stock management

£79 per module

or Complete Business Package **£325**

ARM 3 Turbo Card MkII

Simply The Best



Here it is at last – the all new Mark 2 version of Watford's highly acclaimed ARM 3 processor board for the Archimedes and now also the A3000 series computers. Using the latest surface mount technology on a high quality four layer circuit board we have reduced the overall size to a mere 53mm x 45mm, and the cost to only £169. Mk II upgrade will increase the speed of your micro by a factor of 3 to 6.

Any competent A300 or A400/1 series micro owner can fit the upgrade himself, as we provide full fitting instructions and a special ARM chip extraction tool. However for A3000 micros and those not wishing to perform the upgrade themselves, we will collect, upgrade and return your micro by courier service, at an additional cost of £18.

(A300 and old A440 series owners please note – you will need to upgrade to MEMC1A for ARM3 to work.)

RRP £249

Offer Price £169

Acorn have satisfactorily evaluated Watford's ARM 3 upgrade and the A3000 upgrades are fitted by Acorn approved surface mount technology centre, therefore its fitment will not invalidate Acorn's warranty on the micro.

Concept Keyboards

Standard A3 Keyboard with BBC Software	£138
Standard A4 Keyboard with BBC Software	£109
Archi A3 Keyboard	£139
Archi A4 Keyboard	£110

Archi Mouse Port Splitter

Our handy little splitter unit eliminates the risk of damaging your micro due to constant plugging and unplugging of the mouse by allowing you to connect both, a joystick and a mouse simultaneously to your Archimedes. £15

Archimedes to BBC Serial Link Mk 2

Using this simple data link, it is possible to solve all your BBC to Archimedes data transfer problems. The kit is supplied with a disk, and the necessary cable to connect the two computers.
New RISC OS Version also available (please specify)

For A3000 **£15**
For A5000 **£16**

For A3000 Serial Upgrade (**£19**) required

BBC MASTER

MASTER 128K Micro incl. Acorn's View, Viewsheet, ADFS, BASIC Editor & TERMINAL plus FREE OFFER (see below) **£399**

FREE OFFER

FREE with every BBC Master purchased from us during July

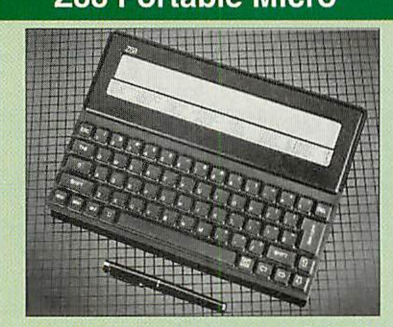
A 5.25" Double Sided, 40/80 track switchable 400K Disc Drive complete with cables and a Utilities disc incl. 2 games, plus

Gemini's OFFICE MATE & OFFICE MASTER

Add-Ons & Accessories

Econet Module for the Master	£42
Twin ROM Cartridge for Master	£9
Quad ROM Cartridge for Master	£14
Master Reference Manual I	(No VAT) £14
Master Reference Manual II	(No VAT) £14
Master Advance Ref Manual	(No VAT) £17
64K Upgrade Kit for B+	£32
Acorn 1772 DFS Kit complete	£49
ECONET Upgrade Kit for BBC B	£42
ALL ECONET UPGRADES Available	
ARIES' IEEE Interface for BBC B & Master	£238
Morley Teletext Adaptor with ATS Rom	£99
Ecolink	£270

Z88 Portable Micro

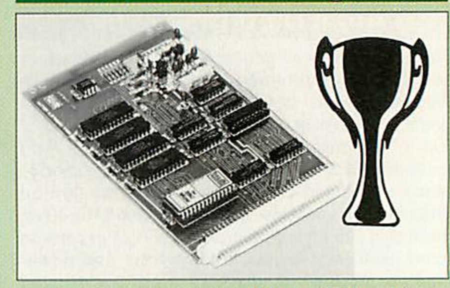


£179

Z88 ACCESSORIES

• 32K RAM Pack or 32K EPROM Pack	£16
• 128K RAM Pack or 128K EPROM Pack	£32
• 512K RAM Pack	£86
• 256K Eprom Pack	£55
• Z88 Eprom Eraser Unit	£38
• Z88 Carrying Case	£8
• AA Nicad Rechargeable Battery	£1.50
• Battery Charger Compact & Fast	£6
• Z88 Serial Printer Cable	£8
• Z88 Parallel Printer Cable	£18
• Z88 to Archi Link	£15
• Z88 to BBC Link £8 • Z BASE	£56
• Z88 to PC Link II £27 • Z88 to Macintosh	£32
• Z88 Mains Adaptor £9 • Z88 Modem	£114

Archi Real-Time Digitiser



Now supplied with NEW RISC OS Version Software

Watfords' Archimedes Video Digitiser is the most sophisticated digitiser ever designed for a micro. It provides a fast and flexible means of capturing images from a video camera or recorder for display and manipulation on the Archimedes range of Micros. Off-air televison signals may also be digitised via a video recorder or TV tuner. Please write for further details.

Price £119

A Set of Colour Filters for colour image grabbing using a video camera £16

Archi Graphic Tablet



The Archi Graphic Tablet offers performance and accuracy comparable to other tablets priced at well over £400, and has the useful addition of a liftable cover, which can hold tracing material or menu templates securely. The package is supplied complete with sophisticated Archi software. (Now, fully LinCAD compatible. Recommended by Linear Graphic for use in Education).
(FREE this month, PC Mouse Drivers & Art package)

Special Price £199

(Price includes Tablet, Leads, Software & Puck)
Stylus Optional Extra **£20**

Archi Graphic Tablet Junior. Working area 9" x 6". Price includes Stylus **£125**

Disc Plonker Rack

When using ones micro, there is a tendency to have more than one Disc on the desk. This exposes them to the hazards of fingerprints, scratches, dust, coffee and an untidy desk. Why not protect your valuable data from all these hazards with the help of our extremely handy and low cost DISC PLONKER RACK. Holds up to eight 5.25" discs.

Protection at Only: £2

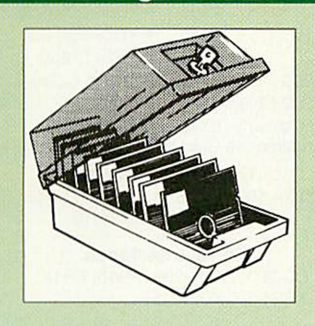
Special Bulk Offer Discs

(Supplied packed in Anti-Static Lockable Storage Units)
(Lifetime warranty on Discs)

BULK PACK DISCS in lots of 100

Type	S/S 40T	D/S 40T	D/S 80T
• Without Sleeves 5.25"	£28	£33	£38
• With Sleeves 5.25"	£31	£36	£41
• 3.5" D/S D/D	£27 for 50		£49 for 100

Antistatic Lockable Disc Storage Units



Gives double protection – Strong plastic case that affords real protection to your discs.
Antistatic helps avoid data corruption whilst in storage. The smoked top locks down.
Dividers and adhesive title strips are supplied for efficient filing of discs.

- **M35** – holds up to 50 5.25" discs £4.95
- **M85** – holds up to 95 5.25" discs £6.95
- **M25*** – holds up to 25 3.5" discs £4.95
- **M50** – holds 50 3.5" discs £6.50
- **M100** – holds 100 3.5" discs £6.99
- **M10** – holds 8 of No. 10 Data Cartridges £15

* Not lockable

Dust Covers (For our Disc Drives)

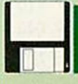
Single CLS (without PSU)	£3.20
Single CS (with PSU)	£3.25
Twin CLD (without PSU)	£3.85
Twin CD (with PSU)	£3.90



3M – Diskettes

3M – SCOTCH Diskettes with Lifetime warranty from Watford Electonics your 3M Appointed Distributor

- *10 x 5.25" S/S D/D 40T (744)* *£5*
- *10 x 5.25" D/S D/D 40T (745)* *£5*
- *10 x 5.25" S/S D/D 80 Track (746)* *£7*
- *10 x 5.25" D/S D/D 80 Track (747)* *£7*
- *10 x 5.25" 1.6M D/S D/D High Density for IBM XT and AT* *£9*
- *10 x 3.5" S/S D/D 40/80 Track* *£7*
- *10 x 3.5" D/S D/D 40/80 Track* *£7*
- *10 x 3.5" Double Sided High Density* *£13*



Top Quality 3.5" & 5.25" Diskettes

To complement our range of Quality Discs and Disc Drives. WE are now supplying SPECIAL OFFER packs of 10 Lifetime guaranteed discs. Each disc has a reinforced hub ring. Supplied complete with selfstick labels and a Plastic Library Disc Box.

- *10 x M3 3.5" D/S D/D 80 Track* *£7*
- *10 x M9 3.5" D/S High Density* *£12*
- *10 x M4 5.25" S/S D/D 40 Track* *£5*
- *10 x M5 5.25" D/S D/D 40 Track* *£5*
- *10 x M7 5.25" D/S D/D 80 Track* *£7*
- *10 x M8 5.25" D/S H/D Hi-Density* *£9*
- *M2 3" Double Sided* *£2.50 each*



CREDIT CARD 24 HOUR Ansaphone Hot Lines (0923) 250234 or 233383

3.5" Disc Drive



These top quality 3.5" Double sided, 80 track, are attractively finished in BBC beige. They are supplied complete with all cables and a Utilities Disc.

Type	Description	
	Disc Drive without PSU	
• **CLS35:**	Single Disc Drive, 400K	£59
• **CLD35:**	Twin Disc Drives, 800K	£109
	Disc Drive with PSU	
• **CS35:**	Single Disc Drive, 400K	£82
• **CD35:**	Twin Disc Drives, 800K	£126

(P.S. CS35 is supplied in a twin case with a blanking plate to enable easy expansion to a dual drive at a later stage)

Disc Drives in Monitor Stand



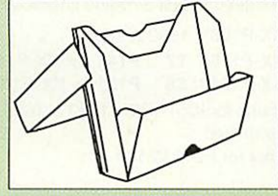
• **CDPM 800S** – Twin 5.25", 800K Double sided 40-80 track switchable disc drives mounted in an attractively finished Beige colour plinth for the BBC B & Master 128K micros. Supplied complete with integral power supply, cables and Utilities disc. The mains switch with neon On/Off light indicator, and the two 40/80 track switches are mounted on the front panel for ease of use.

£165

• **DP35 800** – Same as above except, one disc drive is a 5.25" and the other is 3.5".

£154

Plastic Library Cases



DLC1 – Holds 5 x 3.5" Discs.	£1.50
DLC2 – Holds 10 x 3.5" Discs.	£1.90
DLC3 – Holds 5 x 5.25" Discs.	£1.60
DLC4 – Holds 10 x 5.25" Discs.	£2.00

Disc Albums

Attractively finished in leather-look PVC Vinyl

DW1 – Holds 6 x 3.5" Discs	£2.50
DW2 – Holds 6 x 5.25" Discs	£3.00
DW3 – Holds 20 x 5.25" Discs	£3.50
DW4 – Holds 40 x 3.5" Discs or 5.25" Discs	£4.50

Floppy Head Cleaner Kit

The heads in floppy drives are precision made and very sensitive to dirt. The use of Cleaner Kit is a sensible precaution against losing valuable data. It is recommended to clean the drive head once a week. it is very simple to use. Available in 3.5" & 5.25", please specify.

Price £4

Acorn & Watford DFSs

- Watford sophisticated DFS ROM **£16.00**
- Watford DFS Kit complete **£69.00**
- We will exchange your existing ROM for Watford's ultimate DFS ROM at only **£12.00**
- DFS Manual (comprehensive) **£6.95**
- Acorn DNFS ROM **£17.00**
- Acorn ADFS ROM only **£25.00**
- Acorn 1772 DFS ROM Kit **£49.00**

Watford's MkII 1772

Single/Double Density DFS

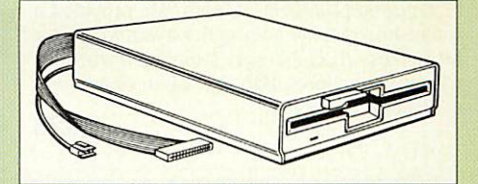
Many of our customers have wanted to use our superior DDFS and Acorn ADFS together. Now our Mk II DDFS Board with its 1772 Disc Controller, has been adapted to allow the use of Acorn ADFS as well. It also has all the commands of the Acorn's 1772 DFS, plus many more added features.

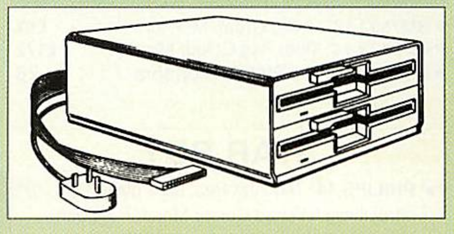
- Complete Kit Special Price **£44**
- DDFS Manual (No VAT) **£6.95**
- We will exchange your existing DFS Kit for our sophisticated DDFS for only **£26**

Quality Disc Drives from Watford

All our Disc Drives are Double Sided and will operate in both Single and Double Density modes. All 5.25" Disc Drives are 40/80 track switchable. For ease of use, the switches are front mounted. Follow the trend with a Watford plinth. (Turn to the 6th page of our advert for the Plinths).
P.S. All our 5.25" Disc Drives with PSU are compatible with the Compact Micro. All you require is our special Compact Disc Drive cables designed by us.

"Test Bureau Approved for Use in Education"



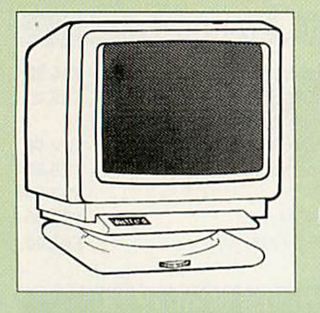


Our Disc Drives conform to BS415

Type	Description	
	Disc Drive without PSU	
• **CLS400S:**	Single, 40/80 track 400K Double sided Drive	**£70**
• **CLD800S:**	Twin, 40/80 track, 800K Double sided Drives	**£138**
	Disc Drive with PSU	
• **CS400S:**	Single, 40/80 track, 400K Double sided Drive	**£80**
• **CD800S:**	Twin, 40/80 track, 800K Double sided Drives	**£149**

Special Cable to connect both 3.5" and 5.25" Disc Drives simultaneously to the BBC Compact £13

Continued→ → → → → → → → → →



FREE Connecting lead with every monitor purchased from us. Please specify type required.

Microvitec Monitors

• **1431** – Standard Resolution Monitor	£169
• **1451** – Medium Resolution Monitor	£209
• **Cub3000** Medium Res for A3000	£189
• Dust Cover for Microvitecs	£5.50
• **Touchtec 501 Touch Screen**	£239

Now 3 years Parts & Labour warranty on all Microvitec Monitors

Multiscan Colour

• Eizo 9060S	£389	• NEC 6FG	£1525
• Eizo F550i	£719	• Taxan 770LR	£362
• Eizo T560i	£995	• Taxan 775	£362
• NEC 3FG	£370	• Taxan 795	£397
• NEC 4FG	£465	• Taxan 875	£685
• NEC 5FG	£850	• VIDC Enhancer	£25

Aries AlphaScan Monitor

Pound for Pound, the AlphaScan VGA Multiscan monitor provides the maximum performance and greatest flexlbility of any 14" colour monitor for the Archimedes micro.

Its multiscan circuitry provides automatic adjustment for frequencies between 30 and 60KHz horizontal, and 50 and 90Hz vertical. Its 0.28mm dot pitch high resolution tube provides super sharp text graphics, while a high speed (70/72Hz) refresh rate provides a flicker-free display easing the eye strain. The Multivideo VIDC Adaptor supplied (free) with the monitor allows high resolution operation in all screen modes.

£325

Philips Monitors

• **BM7502** 12" Hi-res Green Monitor	£67
• **CM8833** 14" Med. Res Colour Monitor	£172
• Dust Cover for Philips Monitors	£6

STAR BUY

• **PHILIPS 14"** Medium Res, dark glass, attractively finished Colour Monitor. A push-button switch toggles between Hi-Res monochrome green text mode and full colour display. (Please state the type of Connecting Lead you require).

ONLY £169

Spare Monitor Leads

BNC Lead for Zenith or Philips	£3
Skart Monitor Lead	£5
RGB lead for TAXAN Monitors	£3
Archimedes Colour Monitor Lead	£7.50

Aries 2000 Colour Monitor

This attractively finished, etched screen medium res monitor is supplied complete with built-in speaker, volume control and video output. All controls are located on the front panel for ease of use. Ideal for BBC, BBC Master, Archimedes and Amiga.

A bargain at £159

VIDC Enhancer



This unique VIDC add-on board for the Archimedes, caters for all types of Multiscan and VGA monitor and mode requirements. There are 2 versions to suit all requirements. The multimode software supplied, provides all the new modes for the selected monitor type, including the now standard Computer Concepts modes. With VGA monitor, you are no longer restricted to a few modes. A WIMP application supplied on disc, allows new modes to be designed and existing modes to be modified for particular monitors.

Super VGA VIDC Card: Its unique design allows the horizontal and vertical sync to be buffered and have the polarity changed under software control **£45**

MultiVideo VIDC Card: As above but for MultiScan monitors only. **£25**

Panasonic Printers

• KX-P1123	£129	• KX-P1695	£270
• KX-P1124i	£173	• KX-P2624	*£275
• KX-P1170	£100	• KX-P2180C	£160
• KX-P1624	£270	• KX-P2123C	£200
• KX-P1654	*£334		

*** Price includes 12 months On-site warranty**

Cut Sheet Feeders

P36 – 1124/24i £79 **P37** – 1123/70/80 £69
P38 – P1624/95; P2624 £129

Buffers

P12 4K Buffer Board for KX-P1081 £55
P14 32K Buffer P1123/24/70/80 P1540/92/95; P1624/54/95 £16

Serial Interfaces

P19 for P1123/24/24i/70/80/1624/54/95/2624 £49

Original Panasonic Ribbons

Guaranteed to last 3 million characters

P110 for KX-P1081, 1592 & 1595 £6
P115 for KX-P1180 £7 **P145** for KX-P1124 £7
P140 for KX-P1540 £8 **P155** for KX-P1624 £8
Colour Ribbons for KX-P1081, 1592 & 1595 Brown, Blue or Red £9 each
P150C Colour for P2123/2180 £15

Citizen Printers

• 120D Plus	£95	• Swift 24E#	£225
• 224	£185	• Swift 24X	£299
• PN-48	£199	• 24X Colour Opt	£32
• Swift 9	£145	• PN48 Ribbon	£4

\# FREE Colour Option with Swift 24E
\+ FREE 2 years Parts and Labour warranty on all Citizen Printers

• Swift 9 Colour Option	£19
• Swift 24 Colour Option	£29
• Swift 24 Ribbons Black £4	Colour £13
• Swift 24X Ribbons Black £8	Colour £16
• Citizen/Archimedes Colour Printer Driver	£15

Integrex Ink Jet Printers

• Colour Jet 132 Printer	£449
• Paper Roll	£6.50
• BBC Screen Dump Software	£10
• Colour Cartridge	£21
• Black Cartridge	£12.40
• 100 A4 OHP transparencies	£55
• 8K Serial Interface Optional	£123
• Colour Jet 2000	£POA
• Betajet Ink Jet Printer	£275

Star Printers

• LC15	£178	• SJ48 Inkjet	£174
• LC20	£105	• XB24-200 Colour	£295
• LC24-15	£245	• XB24-250 Colour	£355
• LC24-20	£158	• XB24 Colour kit	£29
• LC24-200	£170	• ZA200 Colour	£244
• LC24-200 Colour	£305	• ZA250	£310
• LC200 Colour	£143		

• Star/Archimedes Colour Printer Driver £15

Cut Sheet Feeder

LC10/200/24-10	£65	LC15/LC24-15	£125
XB24-10	£80	XB24-15	£139

Serial Interfaces

8K Ser LC-200; LC24-200; FR10; FR15; XB24-10; XB24-15 £52

Buffers

32K Ram Card for LC/XB24-10; 15; LC200 £55

Ribbons

LC10; LC10-II; LC15	Black **£4;**	Colour **£6**
LC-200; LC24-200	Black **£5;**	Colour **£12**
XB24-10; XB24-15	Black **£5;**	Colour **£12**

Laser Printers

All Laser Printers include 12 months On-site maintenance

Brother HL-4	4ppm	£575
Brother HL4-V	4ppm	£675
Brother HL4-PS Postscript	4ppm	£1045
Brother HL8-V	8ppm	£995
Canon LBP4 LITE	4ppm	£529
Canon LBP4+ 1.5M RAM	4ppm	£685
Canon LBP-8 III	8ppm	£970
Canon LBP-8III Plus	8ppm	£965
Epson EPL4300	4ppm	£635
Epson EPL4100	6ppm	£539
Epson EPL7500	6ppm	£1145
Epson EPL8100	10ppm	£965
HP Laserjet IIP+	4ppm	£549
HP Laserjet III	8ppm	£1015
HP Laserjet IIID	8ppm	£1495
HP Laserjet IIIP	4ppm	£699
HP Laserjet IIIsi	16ppm	£2519
NEC Silentwriter S62P P/script	6ppm	£1089
NEC Silentwriter 266	8ppm	£675
NEC Silentwriter 290P P/script	8ppm	£1389
Panasonic KX-P4420	8ppm*	£620
Panasonic KX-P4450i*	11ppm*	£915
Panasonic KX-P4451		£1240
Panasonic KX-4455 Postscript	11ppm*	£1450
Panasonic KX-P4430 Satin Print*	5ppm*	£645
Star LP-8 III 2	8ppm	£1249
Star LP-8 III	8ppm	£910
Star LP-8 Star(post)script	8ppm	£1140
Star LP-4	4ppm	£565
Star LP-4 Mk 3	4ppm	£649
Star LP-4PS Postscript	4ppm	£779

* Now with 2 years On-site warranty

Laser Toners

Canon 2, 3 & 4	£46	Star LP4/LP8	£69
Epson GQ	£13	KX-P4420/50	£19
EPL 4100	£59	Laserjet HP IIP & IIIP	£42
EPL7100/7500/ 8100	£125	Laserjet II/D, III/D	£48
		Qume Crystal (3)	£58

Laser RAM Upgrades

IIP; III/P 1Mb	£51	EPL7100 256K	£39
IIP; III/P 2Mb	£88	GQ5000 512K	£42
IIP; III/P 4Mb	£135	KX4420/50 1M	£75
II & IID 1Mb	£64	KX4420/50 2M	£115
II & IID 2Mb	£99	KX4420/50 4M	£195
II & IID 4Mb	£146	Star LP8 1M	£139
Canon LBP4 1M	£105	Star LP8 2M	£275
Canon LBP8 2M	£125		

Laser Drum & Developer

• Epson Drum GQ5000	£93	EPL7100	£129
• Panasonic 4420 Drum	£60	Developer	£59
• Panasonic 4450 Drum	£93	Developer	£80
• Qume Drum	£76	Developer	£56

Jetpage Postscript Cartridge

• HP IIP/III £225 IID & IIID £227

Various Add-Ons

• Laserjet Appletalk Interface	£135
• HP Adobe Postscript	£399
• Pacific Page Postscript	£259
• HP Premier Font Collection	£28
• Laserjet various Font cartridges	from £45

Hewlett-Packard Printers

# Desk Jet 500	£285	*Paintjet XL 300	£1920
Desk Jet 500 Col.	£429	*Quiet Jet Plus	£415
*Paint Jet Colour	£525	*HP Think Jet	£265
*Paintjet XL	£1225		

3 years extended Parts & Labour warranty £49
* Price includes 12 months on-site warranty

- DeskJet 500 Cart. Black £15; Colour £27
- Paintjet Cartridges Black £19; Colour £23
- Desk Jet 500 256K RAM cartridge £69
- HP Epson FX Emulation Cartridge for Desk Jet £59
- DJ 500 High Capacity Black Cartridge £21
- DJ 500 Colour Archi Printer Driver £15

Plug In Font Cartridges for DJ 500

- 22706B – Prestige, Elite, Line Draw fonts £55
- 22706C Letter Gothic & HP Line Draw fonts £56
- 22707P – Proprint Emulation Cartridge £57
- Desk Jet Unlimited (Book No VAT) £19.75

Canon Bubblejet Printers

	Printer	CSF	D'ble Bin	Ink Cart
BJ10EX	£180	£43	–	£16
BJ20	£265	–	–	–
BJ300*	£284	£88	£65	£12
BJ330*	£380	£110	£79	£12
BJC800C	£1411	–	–	–

* Includes 12 months On-site warranty

- Spare Battery pack for BJ10E £33
- BJ10EX – Archi Turbo Driver £42

Special Offer:
Canon BJ10EX Printer + CC's Turbo Driver £222

NEC Pinwriter Printers

- P20 £180 • P70 £419
- P30 £240 • P90 £635
- P60 £325
- P60/70 Colour Option Kit £59
- Ribbons Black for P20/30 £6 for P60/70/90 £7
- Ribbons for P60/70/90 Black £9 Colour £13.50

Cut Sheet Feeders
P20 £59; P30 £85; P60 £89; P70/90 £80

Epson Printers

DFX5000	£1079	LQ1060 Colour	£595
DFX8000	£1940	LQ1070	£313
FX850	£264	LQ1170	£435
FX1050	£336	LQ2550+	£675
LQ100	£154	LX400	£101
LQ200	£161	LX850+	£140
LQ450	£165	LX1050	£206
LQ570	£201	SQ850	£432
LQ860 Colour	£443	SQ1170	£589
LQ870	£359	SQ2550	£625

Cut Sheet Feeders for

LQ570, LQ870 £47
LX400/850/LQ200/400/450/500/550
LQ1010/1070/1170 £72
LX1050 £115 FX850/LQ860 £128
FX1050/LQ1060/SQ850 £155
LQ2550 £299 SQ2550 £210

Tractor Feed for
LQ800 £44; LQ850/FX850 £69; LQ1050/FX1050 £85; LQ2500 £90; LQ2550 £90.

Accessories

- EX800/1000 Colour Option £45
- EX800/1000 Colour Ribbon £14
- LQ2500 Colour Option £65
- Multifont Card for LQ550/850/1050 £95

Epson Printer Interfaces
RS232 £28 RS232 + 2K Buffer £52

Printer Leads

BBC Centronics 4' long	£5
BBC Centronics 6' extra long	£7
Compact's Special Centronics Lead	£7
Nimbus Centronics Lead	£6
IBM/Archimedes Parallel Lead 6'	£5
IBM/Archimedes Parallel Lead 5 metres	£10
IBM/Archimedes Parallel Lead 10 metres	£15
Double Ended 36 way Centronics Lead 4'	£7
Double Ended 36 way Centronics Lead 6'	£9
RS232 Leads (Various)	P.O.A.

Fujitsu Printers

B-100	£205	DL1100 Col	£267
B-200	£299	DL1200	£363
DL-900	£181	DL3600	£508
DL1100	£217	VM800	£1036

Ribbons

DL900/1100/1200	Mono	£5	Col.	£11
DL3600	Mono	£6	Col.	£12
B-100/200 Ink Cartridge				£15

Plotters

- HP7440AU £925 • HP7475AU £–

Roland Plotters

- DXY1100 £490 • DXY1200 £620
- DXY1300 £825 • DXY2500 £2345
- DXY3500 £2955 • Sketchmate £310
- Roland plotter Pens, Fibre tip £7.50

Listing Paper (Perforated)

- 1,000 Sheets 9.5" x 11" Fanfold Paper £7
- 2,000 Sheets 9.5" x 11" Fanfold Paper £11
- 1,000 Sheets 9.5" x 11" NCR 2 Part Fanfold £21
- 1,000 Sheets 15" x 11" Fanfold Paper £9
- 2,000 Sheets 15" x 11" Fanfold Paper £16
- 1,000 Sheets true A4 Fanfold Paper 70gms £11
- 2,000 Sheets true A4 Fanfold Paper 70gms £21
- Teleprinter Roll (Econo paper) £4

(All our Fanfold paper is Micro perforated leaving a smooth clean edge when the tractor feed strips are detached).

Carriage 1K Sheets £2.50, 2K Sheets £3.00

Printer Labels

(On continuous fanfold backing sheet)

1,000 off, 90 x 36mm (Single Row)	£6.00
1,000 off, 90 x 36mm (Twin Row)	£6.25
1,000 off, 90 x 49mm (Twin Row)	£7.50
1,000 off, 102 x 36mm (Twin Row)	£6.75

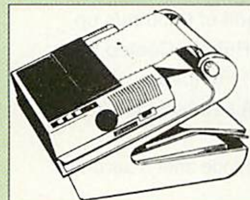
Laser Printer Labels on A4 Sheets

3750 off, 70 x 29mm (3 Rows)	£15.50
3000 off, 70 x 37mm (3 Rows)	£15.25
2625 off, 70 x 42mm (3 Rows)	£15.00

Printer Ribbons & Various Dust Covers

Type	Ribbons	Dust Covers
BBC Micro	–	£3.50
BBC Master	–	£4.00
Archimedes Micro pair	–	£9.00
Citizen 120D	£2.75	£4.50
DMP2000	£2.75	£4.75
DMP4000	£3.75	£4.85
EX800/1000	£3.50	£5.00
RX/FX80/85/800/MX80	£2.95	–
FX/MX/RX100/1000	£3.95	–
Kaga/Taxan KP810/815	£3.25	£5.00
LQ400/500/550/800/850	£3.25	£6.00
LQ1050/LQ2500	£4.00	–
LX80/86	£2.75	£4.50
LX400/800/850	£3.50	£5.00
M1009/GLP	£2.95	£3.75
NEC P2200	£4.50	£5.00
Panasonic KX1080/81	£6.00	£5.00
Panasonic KX-P1124	£7.00	£5.00
Star LC24-10	£2.95	£6.00
Olivetti Ink Jet Cartridges (set of 4)	£6	

Professional Printer Stand



The professional printer stand takes hardly more space than your printer. Due to the positioning of the paper feed and re-fold compartments ie. one above the other, the desk space required for your printer functions is effectively halved. Its ergonomic design ensures smooth paper flow and automatic refolding.

80 Column version £24 (carr. £3)
132 Column version £29(carr. £4)

Universal Printer Sharers/Changer

Connect up to 5 Micros to 1 printer or 5 printers to 1 Micro with our combined, Sharer/Changer switch boxes.

Standard Low Cost Type

Connects	Serial	Parallel
• 2 to 1	£10	£11
• 3 to 1	£13	£14
• 4 to 1	£16	£17

Professional Type

Connects	Serial	Parallel
• 2 to 1	£17	£18
• 3 to 1	£22	£25
• 5 to 1	£34	£38

Cables extra at £6 each

2 Way Compact Printer Switch

A handy 2 way printer switch can be attached to the micro or monitor for ease of use.
• Centronics £18; • Serial £17
(Cables extra at £6 each)

Auto Printer Sharer Switch

Connects	Serial	Parallel
2 to 1	£40	£45
4 to 1	£62	£49
8 to 1	–	£89

256k Multi Spooler

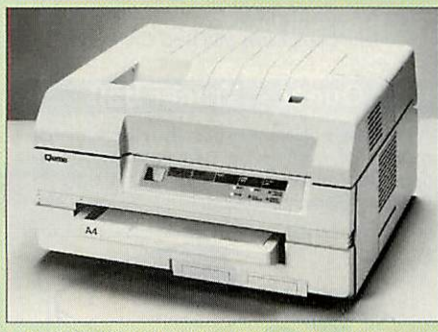
These Auto Parallel Printer Sharers have built-in 256K of Printer Buffers. They can be used as Auto Sharers, Printer Buffers or both.

- 2 In/2 out £135 • 4 In/2 out £169
- 8 In/1 out £199

Compact Converter Units

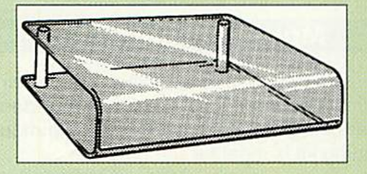
Serial to Parallel £36 Parallel to Serial £37

Laser Direct



- Special High Res Card 600 DPI for Canon LPB 4 & LPB 8 Laser Printers £315
- LPB 4 Printer plus High Res Card £875
- LPB 8III Printer plus High Res Card £1275
- LPB 4 Optional Paper Tray £79

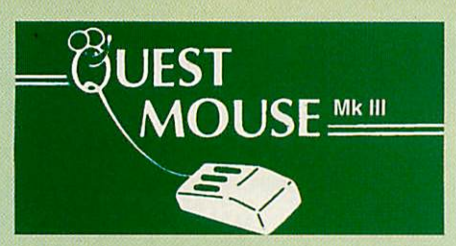
Perspex Printer Stand



Give your Computer System a touch of Class with our elegant, smoke finished Perspex Printer stand.

80 Column version	**£16** (carr £3)
136 Column version	**£20** (carr £4)

Continued→ → → → → → → → → →



- Quest Mouse III & Quest Paint £59
- Quest Mouse III, Quest Paint, AMX Stop Press & Pagefont £89
- Quest Mouse III only £30
- Quest Paint Software only £34
- Quest Font Disc (22 Text Fonts) £15
- Quest Mouse Mat (Red or Blue or Green please specify) £3
- Quest Colour Dump Disc – This new software allows you to print direct from Quest Paint to your Integrex Colour Printer £18

(P.S. Quest Paint is not compatible with BBC Compact)

Quest Paint is the winner of the BBC Acorn User 1990 Award for the Best Art/Graphics software

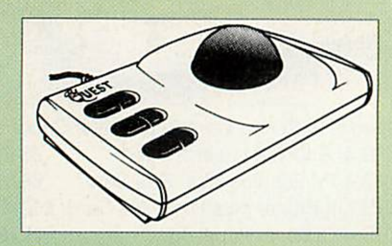


Quest combined with ConQuest and Acornsoft GXR ROM make up THE MOST POWERFUL drawing packages available for the BBC range. Quest Paint is able to take advantage of almost any additions to your machine, such as Shadow or Sideways RAM. ConQuest takes this principal even further, by utilising the otherwise normally incompatible Sideways RAM facility by holding pictures in them.

ConQuest ROM Package £30
(Price includes software in ROM and a comprehensive Manual).
(Not Compatible with BBC Compact)

Quest – Tracer ball

An attractively finished, extremely reliable, mouse replacement, input device. Requires very little desk space. Connects directly to your BBC B, BBC Master or Archimedes Micro.



QT-10 BBC/Master Version **£25**
QT-20 Archimedes Version **£26**

Mouse Cleaning Kit

To obtain trouble free operation and prolong the life of your mouse, the high tech rodent requires regular cleaning. Our deluxe mouse cleaning kit is ideal for the purpose £3



CREDIT CARD 24 HOUR
Ansaphone Hot Lines
(0923) 250234 or 233383

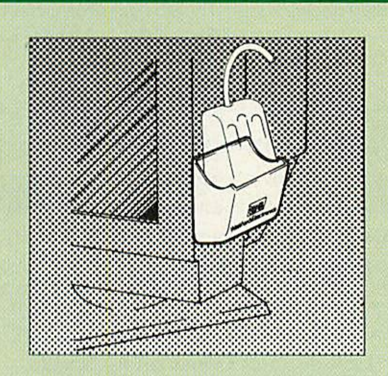
Mk III AMX MOUSE

- **AMX Mouse plus Super Art £54**

(Please specify for BBC, Master or Compact)

- AMX MOUSE ONLY £29
- AMX SUPERART Package £29
- AMX STOP PRESS – A Desktop publishing software. Works with Keyboard, Joystick or a mouse £25
- PAGE-FONTS – Over 20 Fonts for use with AMX Pagemaker £13
- AMX DESIGN (ROM) £29
- AMX EXTRA EXTRA £16
- MOUSE MAT £3

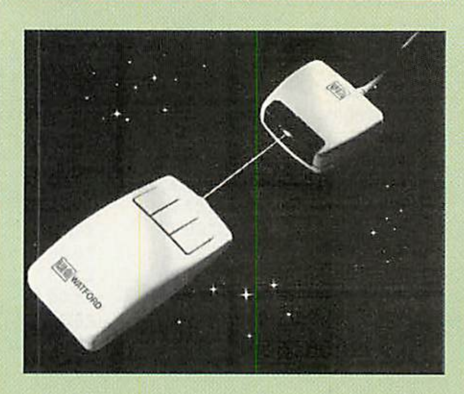
WE Mouse House



Treat your mouse to a cosy Mouse House. This handy little gadget solves the problem of where to store your mouse when it is having a rest. Made of sturdy plastic, the WE Mouse House attaches to the side of your computer, monitor, disc drive etc.

Only £3

Archi Cordless Mouse



Features

- Infra Red Signal Transmission
- High Resolution 200 DPI
- High Tracking Speed of 600mm/s up
- Anti-static Silicon Rubber Coated Ball
- Low Friction Teflon Footpads
- Power - by two AAA size batteries (not included)
- Automatic Standby Mode after 5 seconds inactive
- Auto Power Shut-Down after 20 seconds inactive

Price £49

BEEB VIDEO DIGITISER



"Test Bureau Approved for Use in Education"

Using any source of composite video (colour or monochrome) and the Watford Beeb Video Digitiser, you can convert an image from your camera into a graphics screen on the BBC Micro. This uses the full graphics capacity of the BBC micro in modes 0, 1 or 2. The video source may be a camera, video recorder or television, and is connected via the video output socket. The software supplied includes a sophisticated, fast screen dump routine.
Images produced can be compressed, stored to disc, printed on an Epson compatible printer, directly used to generate graphics, analysed for scientific and educational use or converted to other formats e.g. Slow Scan TV or receiving a picture from a remote camera using a modem. The output from the digitiser exactly matches the graphics capability in each mode, with up to 8 levels of grey in mode 2. The unit connects into the User Port and automatically scans a complete picture in 1.6 seconds.

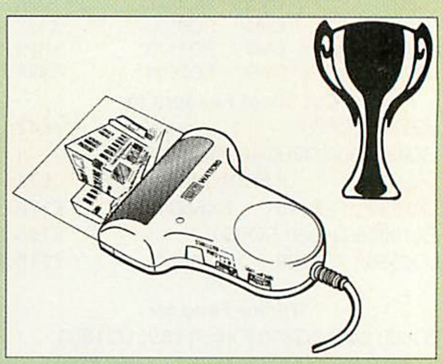
£99

(BBC B+ and Master compatible, except Master with Econet)

(Price includes) Digitiser Unit, Software in ROM & a Comprehensive Manual)

Beeb Hand Scanner

Hand-held Scanner for the BBC Micro

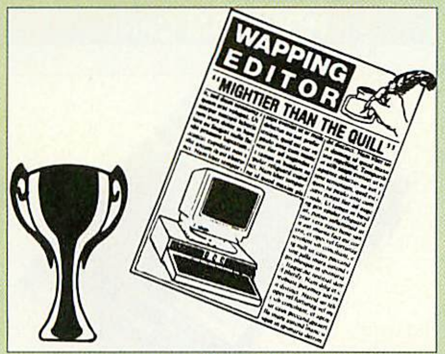


Watford Beeb HandScan is a compact unit which will allow photographs, diagrams, or any other documents to be digitised quickly and easily, to then be used in a desk top publishing package, art program, or even in your own Basic programs!

The HandScan plugs directly into the 1MHz bus on the BBC while a comprehensive set of utilities provided by the sophisticated ROM firmware. The scanner has a resolution of either 100 DPI or 200 DPI when accuracy is essential. Pictures as wide as 4" may be scanned in mode 0 and various types of dithering may be selected to simulate the grey levels of a scanned picture.

All necessary software has been included in the firmware to allow the scanner to read images directly into our Wapping Editor with little more than the click of the mouse. The digitised picture may then be incorporated into your magazine, newsletter, report or any other document.

Beeb HandScan & Firmware **£99**



Winner of the BBC Acorn User 1990 Award for the Best DTP/Word Processor

The Wapping Editor

The Wapping Editor from Watford Electronics represents a breakthrough in Desktop Publishing for the Beeb. The package includes a 64K ROM containing ALL the software needed to get into print fast; a very sophisticated graphics module, professional quality typesetting software, a word processor, a comprehensive font editor for designing your own typefaces, and a variety of printer dumps. This mouse-driven system is designed for the BBC B, the B+ and Master computers and will take full advantage of any Sideways and Shadow RAM that may be fitted. It will run under DFS, ADFS and Network filing systems and requires as a minimum just a single 40 track drive.

Included with the system is a utility disc containing several high quality fonts, various utilities and a ROM image of a Support ROM. A comprehensive 100 page manual completes the package. The Support ROM contains routines to allow an area to be rotated to any angle or distorted to any four-sided shape. Also included are facilities to draw ellipses at any angle and sectors, segments and arcs (in Master or BBC B with Acorn GXR). Another of the features of the Support ROM is a 'Turbo DFS' which gives DFS access times comparable with those of ADFS.

Page Layout Section

The Wapping Editor may be used to create pages of any size from an A6 to a full A3 page. If none of the eight default page types suit your purpose, the stand-alone page creation program may be used to create pages to your own requirements. By using proportionally spaced fonts and genuine microspacing it is possible to print over 150 characters across an A4 page. A unique feature of the Wapping Editor is the 'A5 x 2' page size allowing two A5 pages to be printed side by side onto a single A4 sheet.

The graphics module incorporates the facilities like: pencil, brush, airbrush, polygon, circle, eclipse, fill, cut & paste, etc.

Text may be typeset, either justified or unjustified, in any font anywhere on the page. Simply select which font and text document you wish to use, and pull out a rectangle on the page where you want the text to be – it's as simple as that! Multiple columns may be printed just as easily and a special 'expand' feature may be used to expand the microspacing so that the document exactly fits the space defined.

Word-Processor

The integral word processor is the ideal tool for producing your text documents, although text can of course be read in from any of the other popular word processors such as View, Wordwise etc.

The Font Editor

The font editor module will allow you to design your own typefaces or to modify the ones provided on the utility disc. This sophisticated editor has numerous functions designed to take the tedium and frustration out of producing good looking, well balanced fonts. Each character may be individually proportionally spaced and characters of any size up to 16 x 16 pixels may be defined.
Pictures may also be 'grabbed' from a video source by using the Watford BEEB Video Digitiser.

Wapping Editor Software Pack	**£59**
Wapping Editor plus Mouse	**£79**

(Wapping Editor only works with Master Compact if a Mertec Expansion box is fitted)

Wapping Art Disc

Over 250K of clip art to cut and paste into your Wapping Editor pages. Pictures include maps, transport, people, media, sport, games etc.
Two 'ratio' screens for use with hi-res and rotated A5 pages to ensure images are not distorted when printed out.

Music writing symbols in the form of pattern and brush for quick production of manuscripts are included together with staves.

There are two prepared hi-res pages layed out for printing labels, both single and double width. Ready made label designs are included but these can be easily replaced with your own designs.

A Mode 0 screen dump routine is also included. To pack such a large amount of data onto the discs the screens have been compressed and routines to compress and expand Mode 0 screens are included on both discs. Using the packing routine you can archive large numbers of screens onto a single disc.

£15

Wapping Font Disc 1

Sixteen additional fonts, including smaller version of Oberon and Daisy and two new sizes of the standard font for the Wapping editor.
Also included are three Mode 0 screens containing giant 'headline' fonts to cut and paste to create extra smooth headlines.
Supplied complete with instructions.

£12

Wapping Font Disc 2

This new addition to our Wapping range of DTP software provides you with additional 23 fonts for the Wapping Editor DTP pack. (80 track discs only).

£13

Archi A4 Scanner

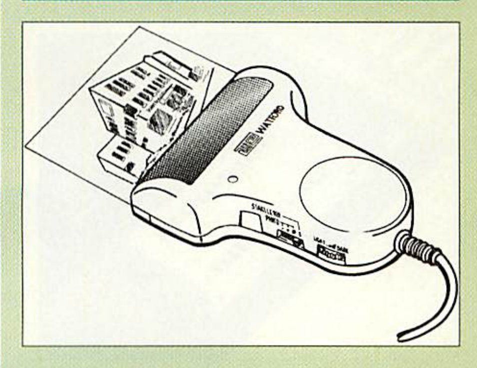


This most advanced Archi A4 image scanner is supplied complete with ROM based podule software. Features provided include facilities for zooming in on an image and inverting the image in X and Y directions, saving and printing of the sprite created. Interactive help is supplied using the !HELP application on the Acorn applications discs.
The 216mm scanning width can cope with both desktop scanning of single sheets, photographs, diagrams, etc., with its fast ten page automatic document feeder, but it can also detach from the feeder to become a convenient hand-held full page scanner for larger documents or pictures.
Scanned image control can be freely adjusted in increments of 10 dots per inch from 100 up to 400 dpi resolution with 64 levels of grey scaling. A built in shading controller and manual brightness control achieve optimum image clarity.
Unlike some scanners, which use a red light source, the Watford scanner uses a yellow/green source which vastly improves the light/dark contrast, thus eliminating the effect where any red-based colours are faded down to white and so do not show up in the scanned image.
All these features and facilities combine to make the Archi Page Scanner the fast and convenient way in which to add that extra impact, interest and clarity to documents, reports, instruction sheets, manuals, news letters, etc., from your Archimedes DTP package.

New Low Prices:

Archi A4 Scanner	£269
Sheet Feeder for above	£75
Scanner + Sheet Feeder	£359

Archi Mk II Hand Scanner



Watford Electronics is now able to offer a complete hand held scanning package, possibly the most essential addition to any desk top publishing system, for only £119. The package includes the most comprehensive utility software available for the Archimedes, a high quality hand held scanner, and all necessary documentation to get you going straight away.

SCANNER

The scanner is capable of scanning up to an amazing 400 dots per inch (DPI)! The scanning area is 4" wide, and the height is only limited by the maximum amount of memory available. The dot resolution may be switched to 100, 200, 300 or the maximum 400 dpi. One of four operating modes may be selected offering either pure monochrome scanning, or one of three grey level modes. The grey level modes use different size dither patterns to represent up to 16 shades of grey. There is also a dial to allow the "brightness" to be adjusted over a wide range, in order to optimise the quality for any specific image. The scanner interface is a standard, single width, expansion card (podule) which plugs into the Archimedes' backplane. The socket on the rear panel connects the scanner by 1.8 metres of cable.

SCANNER SOFTWARE

Full use is made of the windowing and the multi-tasking facilities of RiscOS. The software is supplied in a 64Kbyte ROM located on the interface board. The scanner appears as a small icon on the desktop icon bar, and the software is retrieved from the ROM simply by clicking on that icon. As you scan a page, the image appears in the scanning window on the screen, scrolling up in real time. The other facilities included in the software are.

Cropping and scaling to any size including stretching and squashing in X and Y direction separately.

Colour tinting.
X and Y flip.

Edge detection which turns solid objects into outlines.

Selective directional copying which allows features (i.e. lines or text) to be made thicker or thinner.

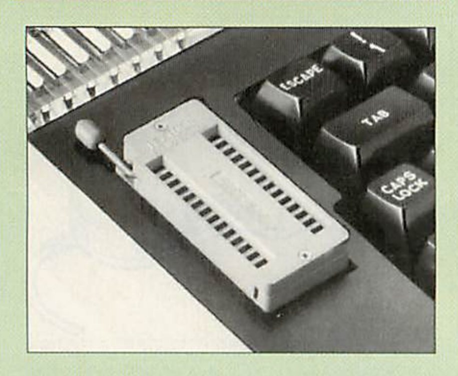
Scanned images may be saved as sprite files or transferred directly into other RiscOS applications (DTP, Draw, Paint) simply by dragging the sprite file into the application's window. Sprites may also be generated using anti-aliasing. This greatly improves picture quality and is particularly effective when scanning material with a range of grey tones, such as photographs. Images can be printed on any printer that is supported by a RiscOS printer driver, with optional settings for portrait or landscape modes, image scale and positioning. Images are printed using the full resolution of the printer and are not limited to the screen resolution.

On-screen help is provided via the RiscOS interactive help facility. Calls are also provided in the ROM for users wishing to write their own software, incorporating the use of the scanner.

AHS-4 Archi 300/400 Version	**£119**
AHS-3 Archi A3000 Version	**£129**

Continued→ → → → → → → → → →

Sideways ROM ZIF Socket System



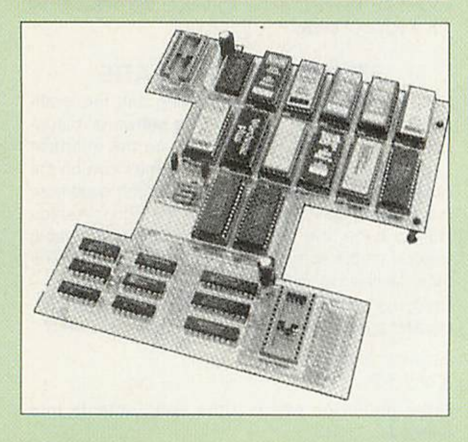
Allows you to change your ROMs quickly and efficiently, without having to open the lid. The ZIF socket is located into the ROM Cartridge's position. It is very simple to install. No soldering required. Also included in the price is a plastic see through storage case with antistatic lining, which allows you to store 12 ROMs. **£18**

ROM Cartridges for the BBC Master

Will accepts the larger Piggy Back ROMs like Interword, Quest, etc.

Twin **£8**; Quad **£13**

Solderless Sideways ROM Socket Board



- Increases your BBC Micro's ROM capacity from 4 to 16.
- **No soldering required.**
- Socket 14 takes two 6264 RAM chips.
- Read protect to make RAM "Vanish") allows recovery from ROM crashes.
- Battery backup option for RAM chips.
- Supplied ready to fit with comprehensive instructions.

Price: Only £35

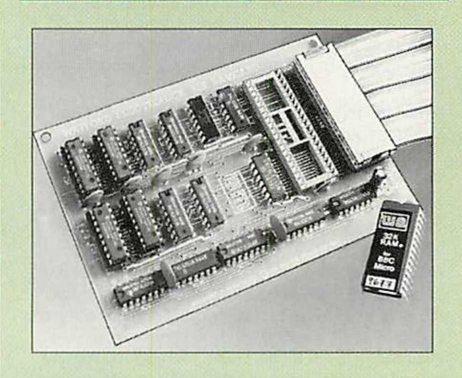
Battery Backup fitted **£39**

Battery Backup only **£3**

16K Sideways RAM **£8**

- Sideways RAM Utilities Disc for Solderless ROM Board. Includes the options to load and save ROM Images and the facility to use Sideways RAM as Printer Buffer. **Only: £8**

32K Shadow RAM/Printer Buffer Card Expansion Board



A MUST FOR WORD PROCESSING

Simply plug the ribbon cable plug into the 6502 socket and gain a massive 32K of extra RAM.

- "VIEW" Wordprocessor users can now type in letters in 80 columns and have up to 28K bytes free – 5 times as much as normal.
- In WORDWISE (or WORDWISE-PLUS), preview in 80 columns with the full 24k of text in memory. This product is recommended as an ideal complement by Computer Concepts.
- Use the full 32k or the bottom 12K of the expansion RAM as a printer Buffer. (P.S. Only 12K printer buffer can be used with Wordwise & WW+, due to the way they are written).
- Unique facility to turn ROMs off and on again.

Only £54

(Price includes a comprehensive manual and the ROM)

- **ARIES B-32 Shadow RAM Card £55**

Commander Joystick



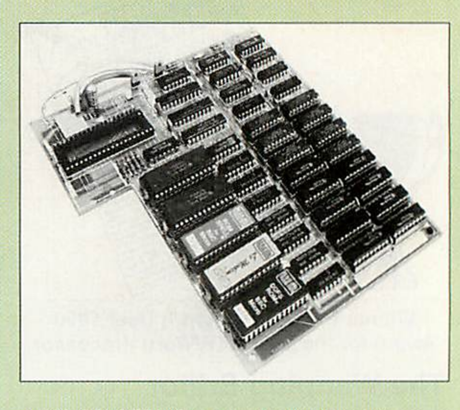
Watford Electronics' new Commander Joystick for the BBC B and Master 128K has a unique dual mode of operation giving selective free floating or self centring fully variable control in both X and Y axis directions. Commander is particularly good for flight simulation and drawing programs.

Features:

- Direct connection to BBC Analogue input port – no interface needed.
- Fully compatible with all BBC Joystick controlled games programmes.
- Switchable springs allow selection of floating or centring operation.
- Trim adjusters for both X and Y axes for fine centre adjustment.
- Convenient stick mounted fire button with additional base buttons.

Price: £15

ROM/RAM Card



- NO SOLDERING required to fit the board.
- Fully buffered for peace of mind.
- Compatible with BBC micros (not BBC+ or Master).
- Total number of ROMs increased from 4 to 8.
- Up to 8 banks of sideways RAM (dynamic).
- Option for 16k of battery backed CMOS RAM (CMOS RAM needs one ROM socket).
- Software Write protect for ALL RAM.
- Read protect for CMOS RAM.
- Separate RAM write register (&FF30 to &FF3F).
- Automatic write to currently selected RAM socket for convenience.
- FREE utilities disc packed with software.
- Large printer buffer.
- UNIQUE fully implemented RAM FILING SYSTEM (similar to the popular Watford DFS).
- ROM to RAM load and save facilities.

The SFS (Silicon Filing System) can utilise up to the full 128k of RAM (with the SFS in any paged RAM) as a SILICON DISC. This behaves as a disc drive, with all the normal Watford DFS features (including OSWORD &7F for ROMSPELL, etc.) to provide an environment that looks like a disc but loads and saves MUCH faster.

PRICES:

- ROM/RAM card with 32k DRAM **£42**
- ROM/RAM card with 64k DRAM **£54**
- ROM/RAM card with a massive 128k DRAM **£89**

OPTIONAL EXTRAS:

- 16k plug-in Static RAM kit **£8**
- 16k DRAM for Upgrade **£13**
- Battery backup **£3**
- Read and Write protect switches **£2 each**
- Complete ROM-RAM card with all options fitted **£109**

Voltmace Joysticks

Delta 3B Single Joystick	**£10**
Delta 3B Twin Joysticks	**£15**
Delta 3C Joystick for Compact	**£10**
Delta 14B Single Joystick	**£11**
Delta 14B/1 Adaptor Module	**£12**
Transfer Software Disc-Tape	**£7**
Delta-Cat A mouse eliminator Joystick for the Archimedes	**£24**

Delta Base B



Analogue aircraft style yoke Joystick to run in the analogue port of the BBC B & Master 128 **£25**

BBC Educational Software

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Supply from BBC power supply to standard Disc Drive Connection: Single **£3.00**; Dual **£3.75**

Disc Drive Interface Leads

BBC to Disc Drives Ribbon Cable
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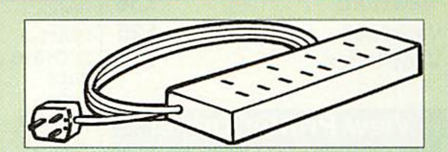
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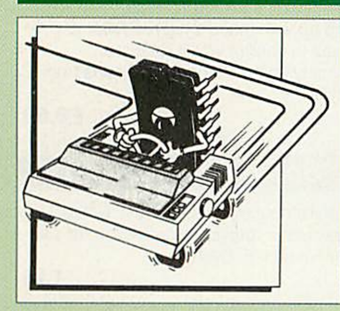
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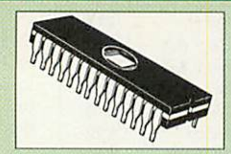
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for BBC B & B+	£12
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(When ordering please specify for which Micro & 40 or 80T Disc)

Assorted ROMS



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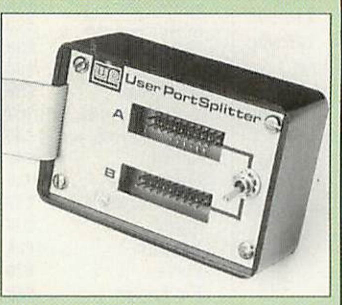
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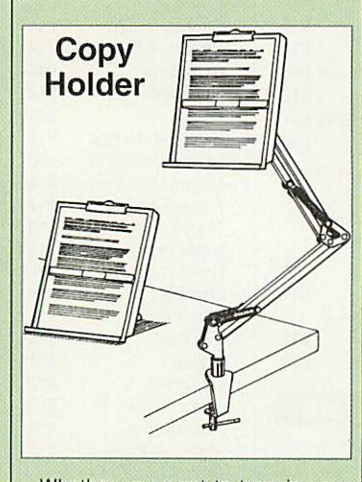
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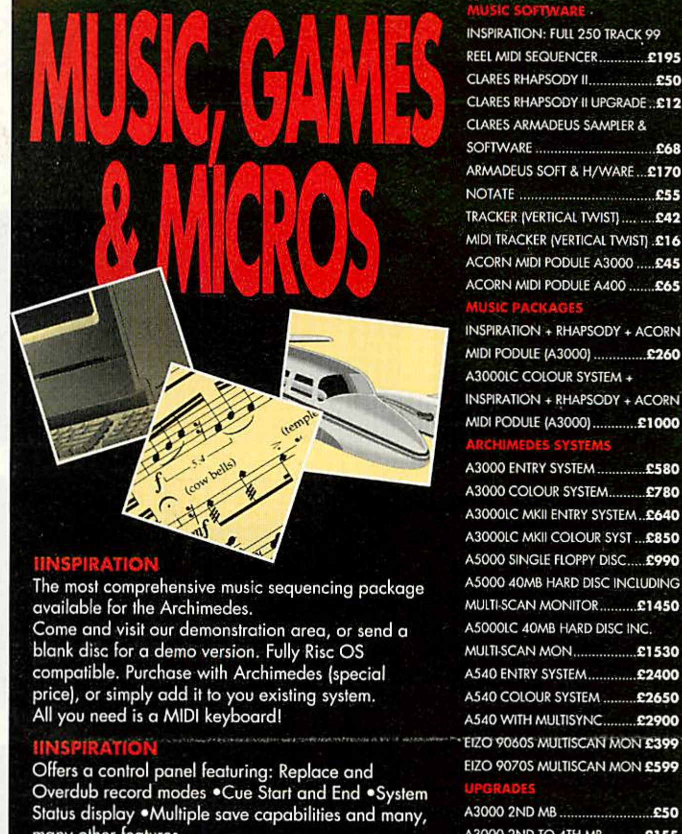
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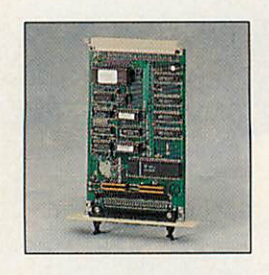
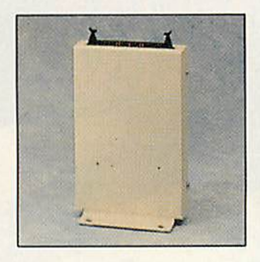
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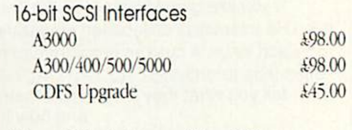
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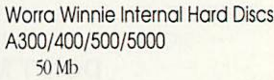
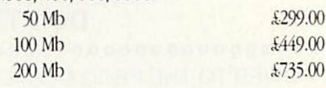





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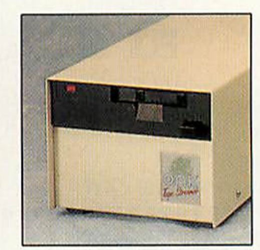



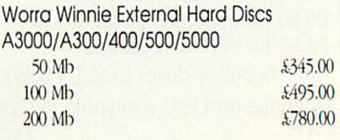
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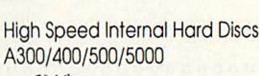






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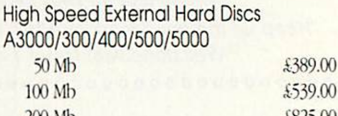
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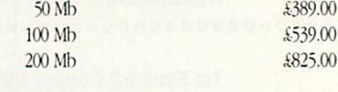






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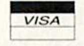
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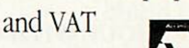
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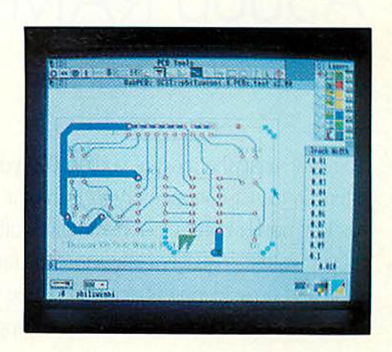
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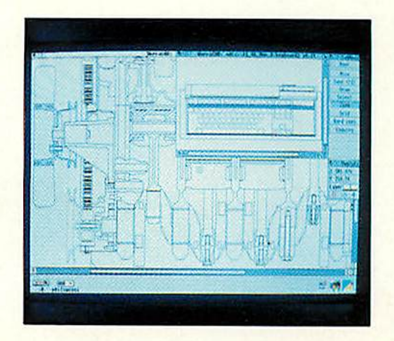
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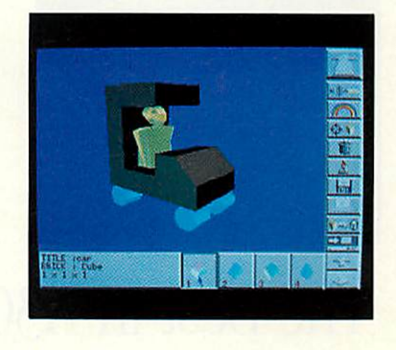
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Draw Print & Plot supercedes our earlier plotter drivers for Drawfiles (WorraPlot and ArcSign - upgrades available). DrawPlot accepts drawfiles and creates output on HPGL compatible plotters. Features outline fonts, sprites, filled areas, line thickness and depth sorting to avoid colours overlapping. DrawPrint accepts drawfiles and allows them to be printed to RISC OS printer drivers at a different scale - for example to create huge posters (cropmarks are created automatically).

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COMPATIBILITY PERFORMANCE

Battle of the Somme

The Battle of the Somme is a multimedia presentation focussing on the events that occurred around the 1st July 1916. The software allows pupils to explore text, sound, graphics, photographs, maps, laservision stills and movie sequences.

The Imperial War Museum have released movie film, photographs and sound recordings for the production of a laservision disc which is available for use with the package.

The package was conceived and produced by the Netherhall School in Cambridge with support from the NCET. It was authored using Genesis II and is focussed on cross curricular resources with worksheets supporting its use in History, English, Maths, Geography, Music and Art.

All materials are accessed via a library using single mouse clicks to navigate the system.

A letters section contains postcards sent back from the trenches by one soldier during 1915 and 1916 which provide an excellent stimulus to written work in the classroom.

A calendar provides easy cross referencing and fast access to specific events allowing the user to dip into dates between 1914 and 1916.

A Roll of Honour database lists all soldiers in the Cambridge Battalion killed on 1st July 1916. This data can easily be amended to contain information more appropriate to different regions. These lists provide good stimulus for activities in Geography and Mathematics classes as well as History.

The application contains songs that were sung to entertain the soldiers. The tunes may be played using the computer's sound system, or a rendition by a male voice choir can be heard via the laservision disc.



A set of maps allow access to information relating to specific areas - starting with a view of Europe and zooming right in to the front lines. A Concept Keyboard may be used at this stage as an alternative to the mouse.

Digitised still images, and those from the laservision disc may be accessed and these provide a wide range of images related to the battle. Audio sound tracks on the laservision disc allow the user to listen to interviews with a variety of survivors of the Somme, and the forty minutes of movie film have been segmented into short clips related to other materials in the package.

A textbook section provides important factual background to the events which took place. Selections include Women at War, Propaganda, The Air War and Joining Up.

Multimedia across the curriculum

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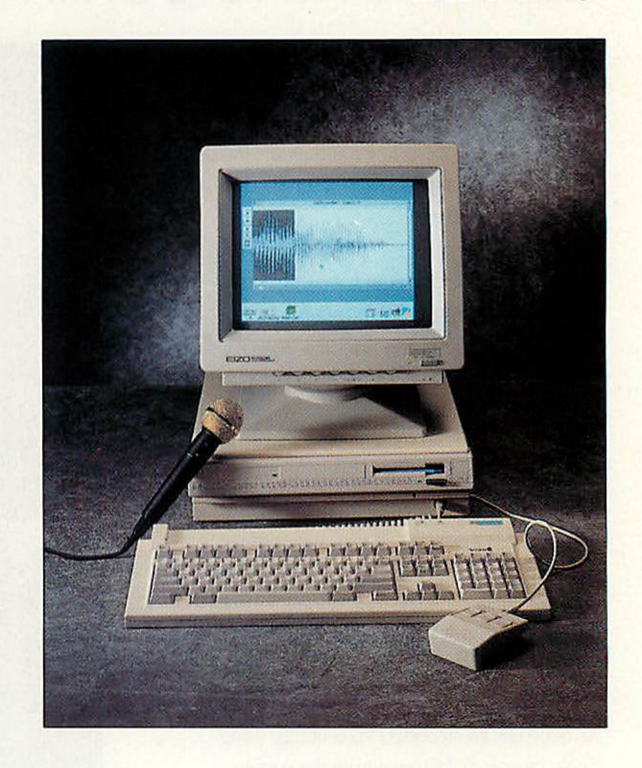
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Oak Recorder is Oak Solutions' low cost sound sampling microphone - the ideal way to capture sounds for your Archimedes. Oak Recorder consists of a hand held omni-directional electret condenser microphone, with integral wind shield and on/off switch, which simply plugs into the printer port of any Archimedes (including A5000) via a 3 metre length of shielded cable.

Oak Recorder is robustly manufactured to withstand the rigours of the classroom, and could not be easier to use. The software supplied with Oak Recorder allows samples to be recorded, played back and transferred to Genesis II and other Archimedes applications via the standard Armadeus file format.

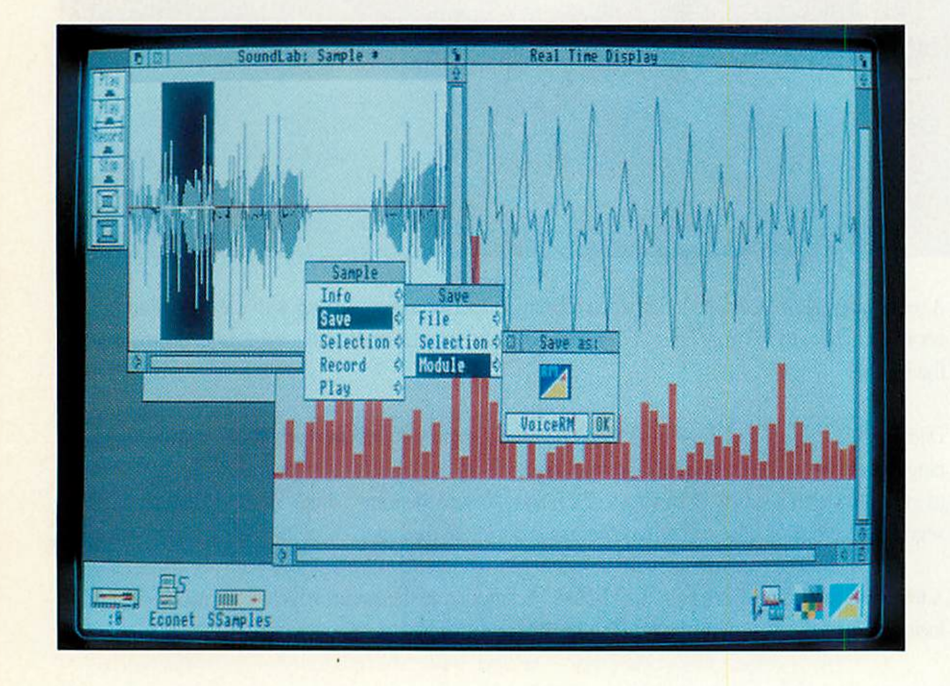
Oak Recorder has several modes of operation; recording may begin on a button press, or be set to start when the sound level exceeds a certain threshold. Sound samples may be edited, and the start and end positions of the sample may be adjusted so that only the required portion of the sound is saved.

A Genesis II support module and application is also supplied for users wishing to integrate real-time sampling within their own Genesis applications. This allows exciting applications such as talking books, interactive modern language self study packages, special effects for school drama productions and sound libraries to be created. Add £3.00 to cover p&p.



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Sound Lab



In response to demand from users, an enhanced version of the software supplied with Oak Recorder has been produced. Many new features have been added, and these will be particularly useful to those with Archimedes music packages and for use in the school physics laboratory.

Sound Lab allows samples to be turned into relocatable modules to provide voices for applications such as Maestro, or to allow the internal voices of the computer to be replaced - your computer could be made to say 'sorry' instead of just beeping when an error occurs!

Sound Lab also provides a real time display with a spectrum analyser and a simple oscilloscope - ideal for investigating waveforms and for doing simple experiments.

Add £1.50 to cover p&p if not ordered with Oak Recorder.

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Genesis II

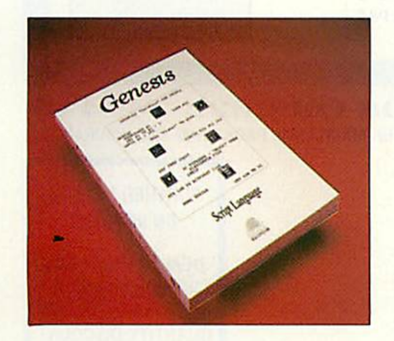
£129.95



The Genesis family of products represent the de-facto standard in multi-media on the Archimedes. Genesis II is the most powerful application in the range, provides all the facilities of Genesis Plus, as well as a comprehensive scripting language which allows even non-technical users to generate their own powerful desktop applications. The script language has the power to control CDROMs and LaserVision players, and can be driven by devices such as Concept Keyboards for special applications. The language can be extended by compiling external modules using the ABC compiler. Upgrades are available to existing users of Genesis and Genesis Plus (including Learning Curve).

£14.95

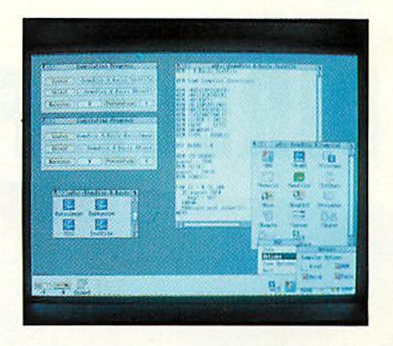
Genesis Script Language Book



The basic use of the Genesis Script Language is covered in the Genesis II manual, but to get the most out of the language and to explore its ability to manipulate lists and databases, to create dialogue boxes and menus and a whole host of more advanced functions, the Genesis Script Language book provides an essential reference work. The book contains a full description each of the 300+ script keywords in its reference section and has chapters on each key area within the script language. VAT is NOT charged on this product.

ABC BASIC Compiler version 3

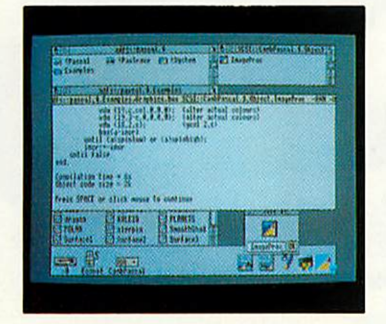
£99.95



The Archimedes BASIC Compiler is the only serious BASIC compiler available for the Archimedes. It is especially suited to the professional user who requires the speed and protection of a compiled language whilst retaining the flexibility of using an interpreted language during the development phase. Compilation under Version 3 takes place as a RISC OS task thereby allowing the machine to be used for other jobs at the same time. Relocatable modules may be created allowing star commands to be implemented, along with library modules which can contain functions and procedures which may be called from any program compiled using ABC, including Genesis II.

£99.95

Cambridge Pascal



The Cambridge Pascal compiler supports a comprehensive version of the Pascal language and includes many extra features such as full string and error handling. Additional extensions allow the use of random access files and provide direct access to the operating system routines including star commands. The compiler runs under the RISC OS desktop and supports conditional compilation, include files and compilation to relocatable modules. Comprehensive error messages and a trace facility ease the development process.A library of procedures and functions is provided to support access to the window manager.

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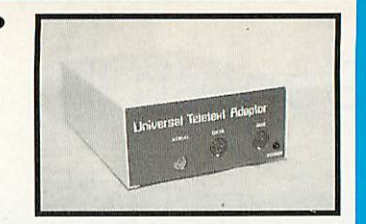
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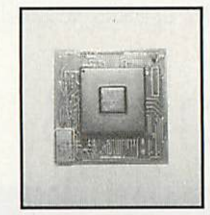
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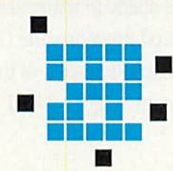
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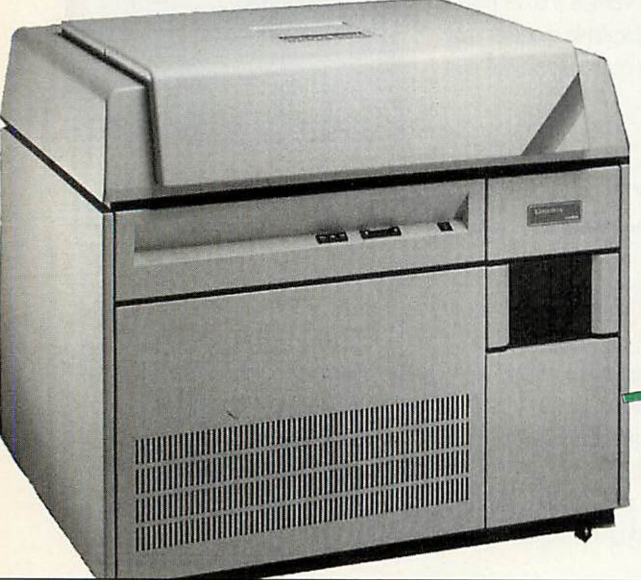
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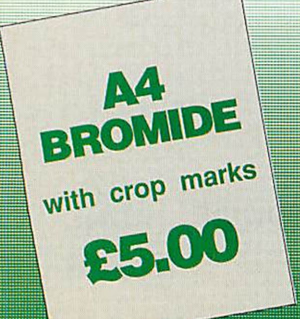


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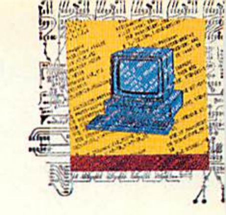
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PROGRAMS

What do we have in store for you in this month's *BAU* program section? Well, for those of you who want to get started in the programming world, we have a page specially dedicated to you. Sarah Burns takes you into the programming arena and, after you've read her article, not only will you know how to type in a program but you will be on the first rung to getting your work published in *BAU*.

David Radford's series on sound continues with a module that lets you take any sample and use it in your own programs. Samples take up a lot of memory and should only be used when necessary, but what happens if you want to add atmospheric sounds to your games and so on...? To solve the dilemma, Dave introduces the *BAU* sound module. It will synthesise sound in real time, using envelopes (just like those on the Beeb) and can be easily incorporated in your own programs. To show you how it's done (and how good it sounds) we have included on the subscribers' disc a futuristic space game that uses the sound module for its special effects. Not only does it sound great, it's great fun to play too!

As always, *INFO is our programmers' hotpot, where the two Daves introduce programming examples from your fellow readers. Included in this month's *INFO is an exhaustive fractal generator program, that can create anything from snowflakes to trees.

Many of you are not quite sure of your logical operators and, this month, the Daves try to clear up the confusion. It's an important area of programming and well worth the effort. Understand these beasts and the world is your oyster.

On another note, have you ever wanted to produce accented letters like À or É? Well, we have just the utility for you. This nifty module for 32-bit machines makes it easy to produce special characters. The module would be particularly useful in the foreign language classroom, where accents, graves and cedillas are commonplace.

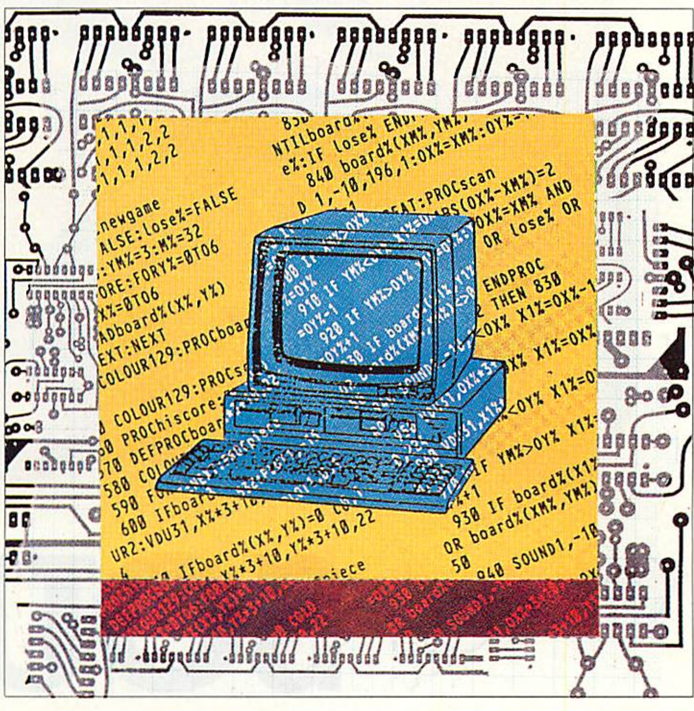
Finally, a program that shows the property of waves in a highly graphical (and realistic) way is my personal favourite this month. The *INFO program clearly shows the effect of waves emanating from a point and bouncing off of walls and into each other.

For fans of the C programming language, this month David Acton adds more features to his time management application, *Timely*. It now boasts the ability to create a planner for any year and a zoom facility for enlarging and shrinking the planner on screen. An updated version of *Timely* is included on the subscribers' disc.

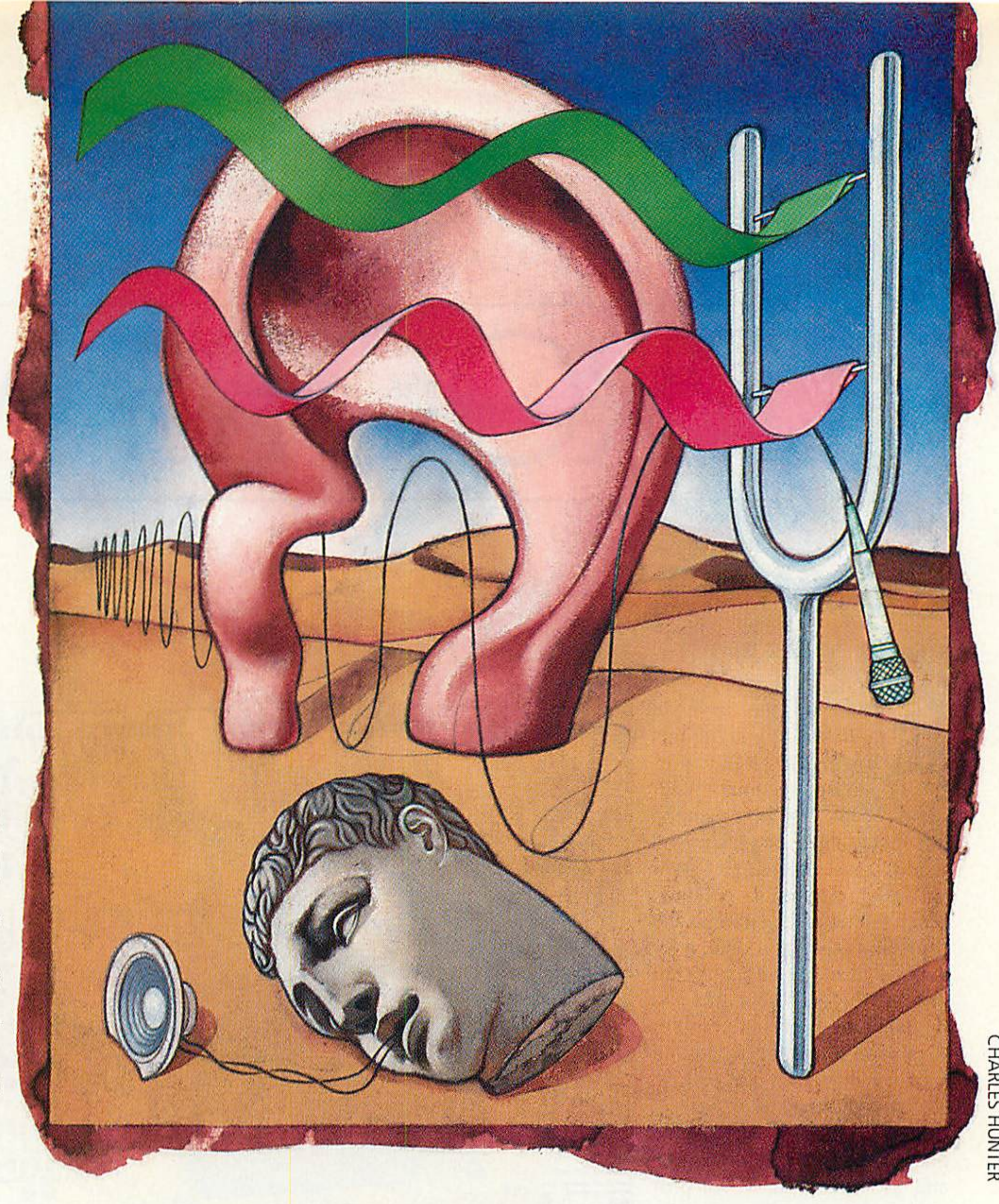
Our regular trip into the depths of the Arm processor chip continues this month, as Dave Lawrence introduces more ways of making your code branch and looks at some conditional jumps.

Last, but not least, in our program section come the yellow pages, where the programs mentioned are listed in full. But why not save your fingers a task and get the free monthly disc instead? Turn to p97 for details on how to become a *BAU* subscriber.

Paul James



CONTENTS



CHARLES HUNTER

This month David Radford shows you how to incorporate sound into your own programs

WIRED UP FOR SOUND

Sound effects can make a huge difference to a program, breathing life into the most mundane creations. And, in this month's sound article, we reach the point you have all been waiting for and show you how to use sound samples in your own applications.

We have already seen how to create and modify samples. Now we need to take a closer look at the sample period. Let's assume, for the time being, that all samples are produced using a sound sampler. When the sample is created, the bytes of data are received from the sampler at a fixed rate, known as the sample rate. The sample period is the time in microseconds between two of these bytes being received.

Playing back a sample involves taking each byte and sending it to the speaker at its original rate. Of course, you need to set the sound hardware in your Archimedes to use this rate, before you send the data. You can do this using:

```
SYS "Sound_Configure",,,<sample period>
```

You can then write a simple voice generator which takes one byte of the sample at a time and sends it to the speaker. This is exactly how the *Wave* program from the first article worked.

Sadly, this method is not always convenient. For example, imagine you have three samples at 48µs (micro seconds) and one at 72µs, and you want to play them all back at the same time. But the sound hardware will only allow one sample period, so which one do you use?

The usual solution is to take the 72µs sample and change it into a 48µs sample like the others. But how on earth do you go about this?

Well, suppose you do nothing to change it and simply play it back at 48µs with the others. As the sample period is the time between two different bytes of the sample being sent to the speaker, reducing this time to 48µs would mean that the bytes are sent more quickly. In effect, the sample is speeded up.

You may remember last month, I showed that altering the speed of playback alters the pitch of the sound. It follows, therefore, that the sample will have a higher pitch. To compensate, we need to lower the pitch by the same amount

beforehand, so that the two pitch changes will cancel each other out. This principle works equally well if you need to increase the sample period, although this time the pitch needs to be raised first instead of lowered.

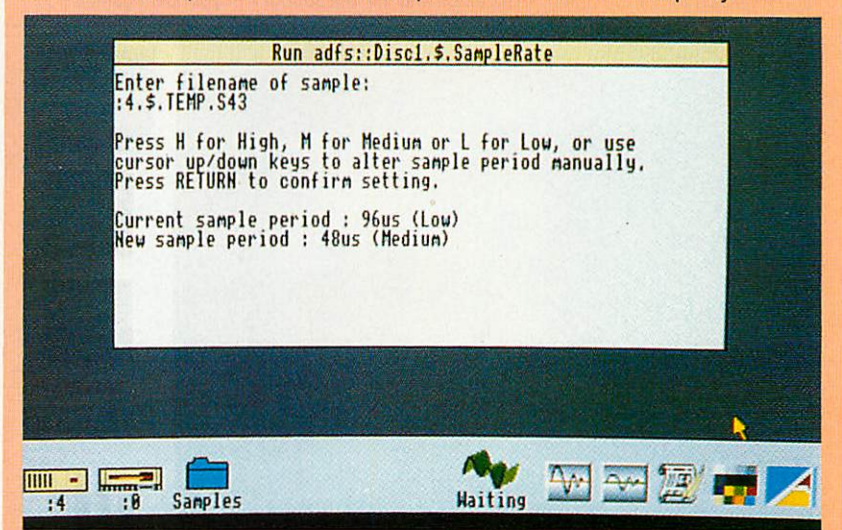
The *SampleRate* program (found in yellow pages) is a short program to do this for you, based around last month's *Pitch* program. Use the up and down cursor keys to set a new sample period, then press RETURN to confirm it. One point to watch is that increasing the sample period causes a reduction of the sound's quality. This drop is permanent, so decreasing the period afterwards won't restore the lost quality. You have been warned!

Some typical values for sample periods are: 24µs which is high quality and close to the period used by CD players; 48µs which is medium quality and is the default playback period on the Archimedes and, finally, 96µs which is low quality and used mainly for taking very long samples.

These three sample periods can be set up quickly in *SampleRate* using the H, M and L keys to indicate high, medium or low rates.

ADJUSTING THE SAMPLE RATE

Samples can vary in the amount of memory they take up. Also the quality is an important factor. To simplify matters, the program *SampleRate* will take a sample and re-sample it to three standard frequencies. Below we re-sampled from low to medium frequency.



PLAY BACK

Of course, this is all fairly useless without a way to play your samples back. Some programs, such as *Tracker*, provide these facilities, while others, like *Maestro*, leave it to other programs. So, if we want to use our samples with *Maestro*, we'll have to write our own routines.

The Risc OS sound system is designed around voice generators. These are short machine code routines that provide sample data in a form ready to be sent to the speaker. The official way of adding new voice generators to the system is to use modules, as voice generators are regarded as extensions to the operating system rather than programs in their own right.

The program called *ModuleGen* in yellow pages can turn a sample into a module, complete with a suitable voice generator. You are asked for the filename and the actual name of the sample. Note that these two can be different.

The latter is the name that will be used for the voice generator and the module's title. Try to be short and descriptive – PluckedString, Laughter or something along these lines. Next, a suitable module will be created and saved to disc. This can be loaded later by double-clicking on the file icon.

There are two main ways to use a voice generator. The first is to provide a musical instrument to use in a music program such as *Maestro*. In this case, the aim is to produce a module that will allow you play the sample back over a wide range of pitches. The other method is to play samples back without altering the pitch at all. This is a useful way to create speech and sound effects to use in games, educational programs and so on. Here the aim is to reproduce the sound as accurately as possible.

The *ModuleGen* listing produces modules that are capable of meeting both demands at once. When you load one of these modules, the sound becomes available for use in *Maestro* or other music programs. It can be treated just like any other instrument. Alternatively, you can force the sample to be played back at its correct sample rate using a simple *command:

```
*SPlay<sample name> [<channel number>]
```

where <sample name> is the name you give the sample. There should be no space between *SPlay and the name, so for a voice called EchoSound you would use:

```
*SPlayEchoSound [<channel number>]
```

When you use the *SPlay command, both the hardware current sample period and the sample's own sample period will be taken into account to try to keep the speed as close to the original as possible. However, a perfect match is not always possible, especially when very small sample periods are involved.

The <channel number> in this command is optional. It gives the channel number on which to playback the sample. Up until now we have tried to avoid the topic of channels but, in truth, the Archimedes can produce more than one sound at a time, by playing each sound on a separate 'channel'. Each channel is independent from the others, and the sample data for them can even be produced by different voice generators. The number of channels available can be selected beforehand from one, two, four or eight with the Sound_Configure command which, as we saw earlier is also used to set the sample period:

```
SYS "Sound_Configure",<number of channels>
```

Note that the number of commas is different this time. To make life easier, Basic provides an alternative way of doing this which is easier to follow: VOICES <number of channels>

REAL TIME SYNTHESIS

So far in this series, we have only looked at samples. Samples are easy to come by, easy to produce, and easy to process. There are, however, two major drawbacks. The first is that they take up large amounts of memory, although this can be reduced to some extent by increasing the sample period or using a compression utility.

The second is concerned more with the musical side of samples. As you know, the pitch is altered by changing the playback speed. But

POINT TAKEN

The trouble with machine code routines is that they only work with whole numbers (integers). This affects operating system calls, such as Sound_Pitch, which are all written in machine code. Sound_Pitch has to return a phase accumulator value, which is nearly always a decimal number.

Fixed point arithmetic is one way around the problem. What is needed is a way to represent decimal numbers using whole numbers. Fixed point arithmetic multiplies by a fixed number, such as 128 or &1000000.

The number used usually has a value of 2^n, where n is a whole number in the range of one to 32, since these numbers can be multiplied and divided easily in machine code.

Let's take an example. Imagine that you need to represent 2.98 with a whole number. You can multiply this by 4096 (2^12), giving 12206.08, which rounds down to 12206. (If precision is important, you can use a larger number than 4096, such as &1000000.) Now, suppose the routine is designed to multiply by 43. 12206*43=524858. Finally, to work out the proper answer, you have to divide by 4096 again to get 524858/4096=128.13916 which is roughly the same as 2.98*43=128.14. The advantage of this method is that it uses integers right up to the end.

SOUND IT OUT

Our exciting game on the subscribers' disc demonstrates how to use the *BAU* sound module to ear-shattering effect! Shoot the enemy and swirl around the galaxy to a variety of space-age sounds.Then try the ultimate challenge and use the *SoundFX* in your own games.



BYTE BY BYTE

Byte zero: Waveform number to use (zero to nine)
Byte one: Pitch envelope to use (zero to nine)
Byte two: Amplitude envelope to use (zero to nine)
Byte three: Volume of the sound (one to 127)
Byte four: Channel number to play effect on (one to eight)
Byte five: Stereo position for effect (-127 to 127)
Byte six: Noise flag (255 for noise, zero for normal)
Byte seven: Unused
Bytes eight to eleven: Pitch value (extended format)

unfortunately the side effect is that the length of playback varies as well. More complex sounds (such as speech) tend to become unrecognisable if you change the pitch by more than about an octave, sometimes even less, making them a bit impractical for music.

If we stick to synthesized sound, it's possible to avoid this problem by creating the sample at the right pitch to start off with. However, this means that you need a separate sample for each note you use – a little wasteful of memory!

An alternative is real-time synthesis. This is where the sample data is only created as it is needed, in other words just before it is sent to the speaker. The advantage of this method is that the sample can be created with the correct pitch for any particular note. And to do this everything has to be written in machine code for speed, which really puts it beyond the scope of these articles.

Still, to give you some idea of what can be done, try *EffectGen*. This program will create a special module called *SoundFX* which can then be used in your own games or other programs. The aim of this module is to allow you to add sound effects to games, using just a few lines of Basic. But before you can use *SoundFX*, you must first set up a data block describing all the sound effects you want to use.

The length of this block depends on the number of effects you define – 12 bytes are needed for each effect and the format of this data is shown in the box on the left. The noise flag determines whether the sound produced uses the waveform given in byte zero, or random noise. Noise is used to simulate percussive sounds, such as explosions and snare drums.

More than one effect at a time can be produced, but only if they use different channels. The number of channels available can be altered, but the maximum is eight. The downside is that the more channels you use, the quieter the sounds become. Four channels is usually about the right compromise.

The pitch value given will vary according to the pitch envelope. Similarly, the volume given will be varied according to the amplitude envelope. These values, therefore, are really only general values. Note that the pitch value occupies four bytes but all the others use only single bytes. Once this block has been set up, you need to inform *SoundFX* using:

SYS "SoundFX_Init",<effects>,<table ptr>,<channels>

where <effects> is the number of effects, <table ptr> is a pointer to the data describing the effects, and <channels> is the number of channels to use.

I would recommend that you use a standard procedure to build the table and initialise *SoundFX*. An example of such a routine is included as part of *SFXGen*, and it is called PROCinitsound.

GET AN EFFECT

Once *SoundFX* is initialised, you can generate an effect using: SYS "SoundFX_GO",<effect> where <effect> is the number of the effect. Effects are numbered according to their position in the data block (counting from zero). After you have finished with *SoundFX*, you should always tell it so using SYS "SoundFX_Quit".

If you have a sound on/off option in your game, you can switch the effects on and off by using: SYS "SoundFX_On" and SYS "SoundFX_Off"

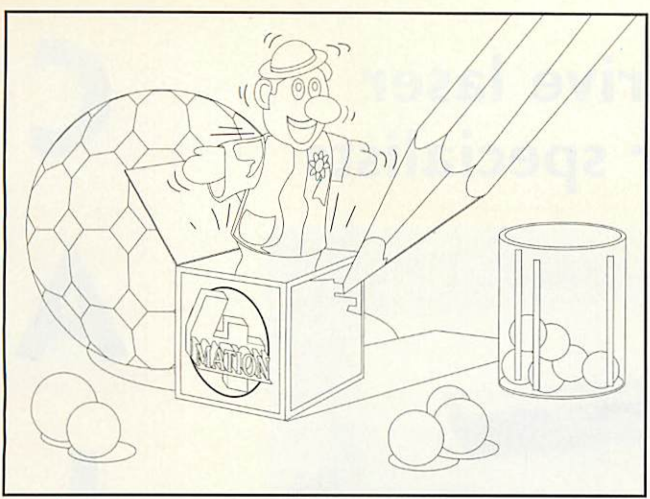
The module can support 10 different waveforms, 10 amplitude envelopes, and 10 pitch envelopes. However, not all of these are defined. To this end, a command has been provided to allow you to modify the envelopes. This is: SYS "SoundFX_Env",<type>,<data ptr>,<length>,<number> where <type> is zero for an amplitude envelope, one for a pitch envelope, and two for a waveform; <length> is zero for waveforms and pitch envelopes, but gives the length of data for an amplitude envelope; <data ptr> is a pointer to the new data, and <number> is the number of the waveform or envelope to replace (zero to nine).

Waveform data is always 256 bytes long, and is in linear signed format (like *Armadeus* files). A pitch envelope is also 256 bytes long. The range is -128 to 127, where -128 is down one octave and 127 is up an octave. Amplitude envelopes can be any length, from two to 256. The range is zero to 128, where 128 is maximum volume and zero is silence.

IN ACTION

As a special treat for *BAU* subscribers, on the monthly disc, is a bonus game called *Foray*, which shows off the *SoundFX* module. When loaded, it will install itself on the icon bar, and you will have to click SELECT over this before you can play the game. It is shown in action in the screenshot above. Simple instructions are included in the scroll-text on the title page, but basically the aim is to blast everything in sight!

And that's it for this month. You should by now be able to make better use of sound in your own programs. Next month, we will pull all of these concepts together and provide an extended version of the original *Wave* program that works in the desktop.



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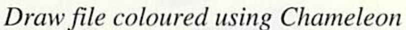
Rob Miller BBC Acorn User May 1992

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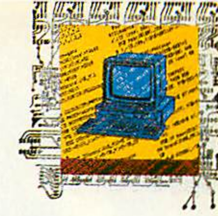
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- Change fill colours
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Draw file coloured using Chameleon

MATION

Illustration by Hans Rijnen



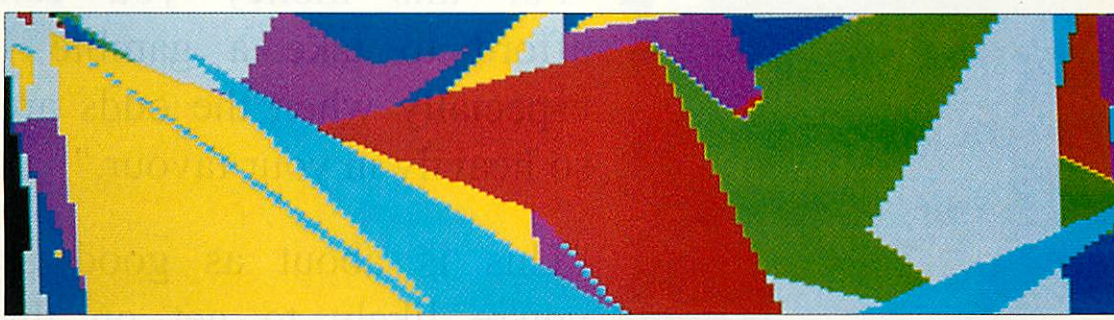
The foolproof guide to programming in Basic by Sarah Burns

ABSOLUTE BEGINNERS

Strange but true, there is great satisfaction to be gained from typing in a program and ending up with a swirling chaos pattern. Or a handy shortcut, graph, idea planner or game. Yet it's a daunting task typing in yellow pages: long long lists of numbers, funny symbols and vaguely familiar words, jumbled together in a way that just doesn't make sense. And, let's face it, if you're an absolute beginner, the instructions on page 83 are not exactly encouraging.

So, to help novices far and wide, here is the concise way to program your computer. Before you start, make sure that you have a formatted floppy disc to hand. Follow closely and we shall begin...

```
10 REM Random Triangles
20 REM by Paul James
30 REM for all machines
40 REM (c) BAU August 1992
50 :
60 MODE 2
70 VDU 23;8202;0;0;0;
80 REPEAT
90 GCOL 0,RND(7)
100 PLOT 85,RND(1279),RND(
1024)
110 UNTIL INKEY(-99)
```



Swirly, whirly and bright – the end result is not recommended for those with a hangover

As a beginner it is often difficult to know where to start. You may already know that a computer program is a list of commands. But you can not simply type in these instructions on the empty screen.

To enter the commands (shown above) that make up a program, you need to temporarily put the desktop to sleep. Press key F12 and a white line with a small black star will appear at the bottom of the screen. The desktop is now paused, and the computer is ready to receive your every instruction. You need to save the program on to a floppy disc, so type in ADFS after the star and press RETURN. Then type Mount 0 and press RETURN once again.

The program's commands are written in a special language called Basic, which the computer can understand. Type Basic and press RETURN to enter commands in this language. The prompt symbol > will appear. It will also tell you how many bytes are available or, in other words, how much room there is inside the computer for you to use. You can't go wrong yet!

Now we are ready to type in the commands. At first you may find it difficult to type the commands in the small space at the bottom of the screen. Type in MODE 12 to make use of the whole screen. It also changes it to white on black – highly advisable if you want to prevent a creaky neck and strained eyes.

Now carefully copy in *Triangles*, the simple program shown on the left of the page. Copy each line after the > symbol and press the RETURN key when you have finished a line. If you spot a mistake after pressing RETURN, don't panic! It is not too late to correct it. Simply place the cursor (using the cursor keys, not the DELETE or COPY key) at the beginning of the incorrect line.

Now hold down the COPY key. You will see that this moves the cursor and copies the line underneath. Stop before you get to the mistake and type in the correction. Then skip past the incorrect part of the original line (using the cursor key) and finally, copy the rest of the line, using the COPY key. It doesn't matter that the line now appears twice, as the second line will automatically override the first incorrect one.

If the computer finds a mistake at this stage, and comes up with some strange message, check very carefully that you have copied the line exactly as it is written. When you have finished the program, save it by typing SAVE "Triangles". Now for the big moment. Type RUN to actually make your program work.

Oh dear! Chances are that your big moment will be an anti-climax. Chances are, that you will not notice some of your own mistakes, especially if you are new to this programming lark. But nothing escapes the computer's eagle eye.

Not to be fooled, it tells you exactly how careless you were and MISTAKE AT LINE 20, NO SUCH VARIABLE or SYNTAX ERROR are all common blunders. If any of these appear, fear not: it's never too late to amend a finished program. Type LIST followed by the incorrect line number. The faulty line will now appear.

Correct it by using the COPY key as we explained earlier. Type RUN again. You may find that the computer continues to find mistakes. Don't give in, just keep listing the program and correcting it until the program finally runs. Some mistakes are particularly elusive. Turn to our Points to Watch box below for help when you get stuck.

Then... just when you are about to dive for the off button in despair, you type in RUN and, hey presto, the program works. Since this is your first step to boffinhood, be sure to show it off to all and sundry. Next stop – yellow pages!

POINTS TO WATCH

- A common mistake is to confuse the capital letter O with the digit zero. In Basic, the digit zero has a line through it (Ø) so that you can tell the difference.
- Spaces may not mean much to you, but can mean lots to a computer. Make sure you copy them in as carefully as the text itself.
- Basic is very sensitive. and cannot tolerate a mish-mash of upper and lower-case letters in an instruction. Take heed and copy carefully!
- What is opened must be closed! The message, Warning: Unmatched ( ) is the computer's way of telling you that you have forgotten to open or close a bracket in the line.
- Bogus lines are the nightmare of any self-respecting programmer. You may suddenly find yourself with a line that should not be there, such as a line 2 for instance. To delete it, type in the bogus line number and then press RETURN.

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MALCOLM BROWN, BBC ACORN USER JUNE ISSUE 1992

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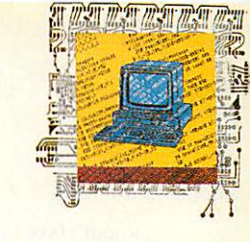
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Dave Lawrence and Dave Acton present their monthly mix of programs for all Acorn users

STAR PROGRAM

IFS CODES

Programs: IFS8, IFS32
Description: Graphic and mathematical demo
Author: Gareth Eley
Machine: IFS8 – all machines; IFS32 – 32-bit only
Listings: 260 lines Basic, 370 lines Basic and Arm code

IFS or Iterative Function System codes are a concise way of describing a wide variety of fractal images. In these two programs Gareth Eley brings IFS to the Beeb and the Arc.

The invention of IFS codes by Michael Barnsley allowed different fractal images (like the Sierpinski triangle, the Koch curve and the ferns and trees we've seen in *INFO before) to be plotted by a single program. Gareth Eley has written IFS for eight-bit and 32-bit machines alike to provide a demonstration. Simply enter a number from one to eight to display the fractal of your choice. Each one is defined by just a few DATA lines at the end.

The box on the right explains some of the theory behind IFS codes and, after you have digested it, Gareth's program should be quite easy to follow.

If you press Q while plotting is in progress, you can select an area to 'zoom in on'. A check is made at the start to see which machine you have and so the zoom box is moved using the mouse or keys. On the Arc, Select increases the

IFS codes can describe fractal images, such as this fern, in a concise way

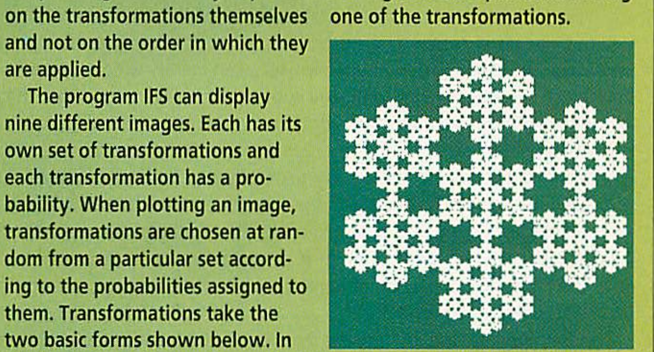
INTERACTIVE FUNCTION SYSTEM

So-called IFS codes can be used to produce a wide variety of fractal images from Sierpinski's Triangle to ferns and trees. The very simple process was invented in the mid-80s by Michael Barnsley and he called it *The Chaos Game*.

IFS codes are transformations which, when repeatedly used on two numbers x and y, produce a unique image which only depends on the transformations themselves and not on the order in which they are applied.

The program IFS can display nine different images. Each has its own set of transformations and each transformation has a probability. When plotting an image, transformations are chosen at random from a particular set according to the probabilities assigned to them. Transformations take the two basic forms shown below. In the first transformation (type 0) a matrix a and a vector b are used, both of which contain only constants. x' and y' are the previous co-ordinates. In the second (type 1), h and k are constants, theta and phi are angles, r and s are scaling factors. This latter form is particularly useful when a transformation requires a rotation. Incidentally, the SIN and COS in the second transformation are worked out by IFS before plotting begins, so all transformations can subsequently be handled in the same way.

Associated with each transformation or IFS code is a probability. To produce the complete fractal a point is continually transformed, taking at each stage one of the set of IFS codes at random, according to the probabilities assigned to them. The point is transformed, plotted, and then the process is repeated choosing a new IFS code at random. A suitable starting point for an image is found by solving a linear equation involving one of the transformations.



In some cases the IFS codes that describe a fractal have equal probabilities. For example, Sierpinski's triangle is defined by three IFS codes each with a one in three chance of being used at any stage of plotting. The fern however is defined by four IFS codes, one has a mere 2 per cent probability and another has a 70 per cent chance.

The Collage Theorem, devised by Michael Barnsley, can be used to find a set of IFS codes to describe a fractal image. This means starting with a copy of the image and then scaling, rotating and transforming it so the copy matches some part of the original.

$$\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{pmatrix} \begin{pmatrix} x' \\ y' \end{pmatrix} + \begin{pmatrix} b_1 \\ b_2 \end{pmatrix}$$

$$\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} r*COS(theta) & -r*SIN(theta) \\ s*SIN(phi) & s*COS(phi) \end{pmatrix} \begin{pmatrix} x' \\ y' \end{pmatrix} + \begin{pmatrix} h \\ k \end{pmatrix}$$

zoom box size and Adjust reduces it. Menu plots the zoomed area. On an eight-bit machine, use the cursor keys (with SHIFT for extra speed) to move the zoom box. The keys < and > alter the size and SPACE displays the zoomed area. On any machine, press ESCAPE to return to the menu or CTRL-ESCAPE to quit.

For 32-bit users there is also a machine-code version *IFS32*. This works in exactly the same way as *IFS8* (the data at the end is in the same format) only much faster.

The DATA statements at the end of the listings can easily be adapted to include your own definitions. Ensure that you use the same line numbers as the published versions – they are used explicitly to locate the data for particular fractals. The first set of data contains the number of definitions followed by their names. Next are the line numbers at which the definitions begin.

A definition consists of the number of IFS codes, the type of IFS codes, the codes themselves, the probabilities for each IFS code and the expected bounding box of the fractal (used to scale the image accordingly). If the IFS codes are of type zero the data for each code consists of the a matrix and then the b vector. Type one codes are stored as the scaling factors r and s, the angles theta and phi and then the b vector as for type zero. For further information on IFS codes, Gareth recommends: *Chaos* by James Gleick, published by Cardinal and *The Science of Fractal Images* edited by Peitgen and Saupe, published by Springer-Verlag.

INTERNAL KEY NUMBERS

low	0	1	2	3	4	5	6	7
high	0	Esc	`	Home	P	G	C	Alt (R)
1	F1	1	Page Up	[	H	V	Ctrl (R)	
2	F2	2	Num Lock	]	J	B	Left	
3	F3	3	/ (kp)	\	K	N	Down	
4	F4	4	* (kp)	Delete	L	M	Right	
5	F5	5	# (kp)	Copy	:	,	0 (kp)	
6	F6	6	Tab	Page Down	"	.	. (kp)	
7	F7	7	Q	7 (kp)	Return	/	Ent (kp)	
8	F8	8	W	8 (kp)	4 (kp)	Shift (R)		
9	F9	9	E	9 (kp)	5 (kp)	Up		
A	F10	0	R	- (kp)	6 (kp)	1 (kp)		
B	F11	-	T	Ctrl (L)	+ (kp)	2 (kp)		
C	F12	=	Y	A	Shift (L)	3 (kp)		
D	Print	£	U	S		Caps Lock		
E	Scroll Lk	Bksp	I	D	Z	Alt (L)		
F	Break	Insert	O	F	X	Space		

Table 1: L and R indicate left and right versions of keys, kp indicated keypad versions. The high hex digit is shown down the side, the low digit across the top, such as Caps Lock=&D5.

BEGINNERS' BIT

You can't go far in computer programming without coming across logical operators. These are not great big monsters, but merely simple operations much like the 'friendly' add and subtract. The difference is that they are generally used in conjunction with binary numbers. Assuming you know what binary numbers are, there really is nothing to to it.

In the land of computing there are generally four logical operators: AND, OR, EOR and NOT. Although others exist in maths (NAND, NOR and so on) these are simply combinations of the four outlined above. AND, OR and EOR each take two parameters in much the same way as addition or subtraction. NOT on the other hand is a unary operator and takes only one parameter like SIN or INT.

The simplest way to illustrate the operators is by means of a 'truth table', a table in which all possible input situations are shown along with their corresponding outputs – a school multiplication table with numbers 1 to 10 along the top and side is effectively the same thing. Usually such methods are not appropriate because of the sheer variety of input, but with binary 0s and 1s it's easy.

AND			OR			EOR			NOT	
A	B	A AND B	A	B	A or B	A	B	A EOR B	A	NOT A
0	0	0	0	0	0	0	0	0	0	1
0	1	0	0	1	1	0	1	1	1	0
1	0	0	1	0	1	1	0	1		
1	1	1	1	1	1	1	1	0		

If you examine these tables you should see that the operator's functions are pretty obvious. Think of the values 1 and 0 as representing true and false and the whole thing starts to work as it does in English. AND is 1 if both of its parameters is 1, OR is 1 if any of its parameters is 1 and NOT is 1 if its parameter isn't! EOR is perhaps not quite as aptly named and it is 1 if either, but not both, of its parameters are 1. If you like, it could be considered to be 'not equal'. The clever thing about EOR is that if you EOR a number twice with the same number you get back to where you started, EORing a number therefore does not lose any information providing you remember what you EORed it with! This is a common way of quickly encoding data.

ACCENT

Program: AccentSrc
Description: Utility
Author: Jan Maurits Faber
Machine: 32-bit
Listing: 160 line Arm machine code

Inserting foreign accents in your text can be laborious process, but this relocatable module makes it easy.

Simply run *AccentSrc* and it will create, save then install the module *Accent*. Keypresses are monitored by the module so that certain friendly combinations can be used to produce foreign characters. To insert an accent hold down the left ALT key and press the two appropriate keys in sequence. For example, E then \ will produce È. O then / produces Ó. Jan has chosen combinations that bear a resemblance to the desired character, so they should be easy to remember!

Table 2 (above right) summarises the keys available. The first columnin the table is the word of data that must be included in the table at data% so that the sequence will be recognised. In the next column are the two key codes that must be pressed with the left ALT key to produce the characters shown in the last column. Upper case then lower case are shown. All but the last three characters are available using the standard system font. The final three (left and right hand quotation marks, 'dagger' and 'bullet') are available using certain outline fonts.

data%	Keypresses	Results
&3C33C0E0	A\	Àà
&573CC1E1	/A	Áá
&3C16C2E2	A^	Ââ
&463CC4E4	"A	Ää
&3C29C6E6	AE	Ææ
&3329C8E8	\E	Èè
&5729C9E9	/E	Éé
&2916CAEA	E^	Êê
&4629CBEB	"E	Ëë
&332ECCEC	\I	Ìì
&572ECDED	/I	Íí
&2E16CEEE	I^	Îî
&462ECFEF	"I	Ïï
&3E1CD0F0	D+	ð
&332FD2F2	\O	Òò
&572FD3F3	/O	Óó
&2F16D4F4	O^	Ôô
&462FD6F6	"O	Öö
&332DD9F9	\U	Ùù
&572DDAFA	/U	Úú
&2D16DBFB	U^	Ûû
&462DDCFC	"U	Üü
&3115C7E7	[5	Çç
&46319094	"[	‘“
&46329195	"]	’”
&1D1C9C8F	£=	†•

Table 2: Accented letters supported by the Accent module.

To add your own accented character simply add a word of the form &AABBUULL to the list at data%. AA and BB are the internal key numbers of the keys to be pressed (summarised in Table 1) and UU and LL are the upper and lower case characters to be produced.

Risc OS already supports some special characters (try using ALT-C, for example) so be careful not to use sequences like this. Also, note that AA should be higher than BB.

STARS IN THEIR EYES

Program: 3Dstars
Description: Graphic demo
Authors: Matthew Godbolt and Richard Talbot-Watkins
Machine: Eight-bit
Listing: 380 lines in 6502 machine code

3Dstars is a program that ably demonstrates the graphics capability of eight-bit machines. The program produces an effect that is reminiscent of flying down a hyperspace tunnel. Or, at least, it's remarkably similar to the last time I flew down one!

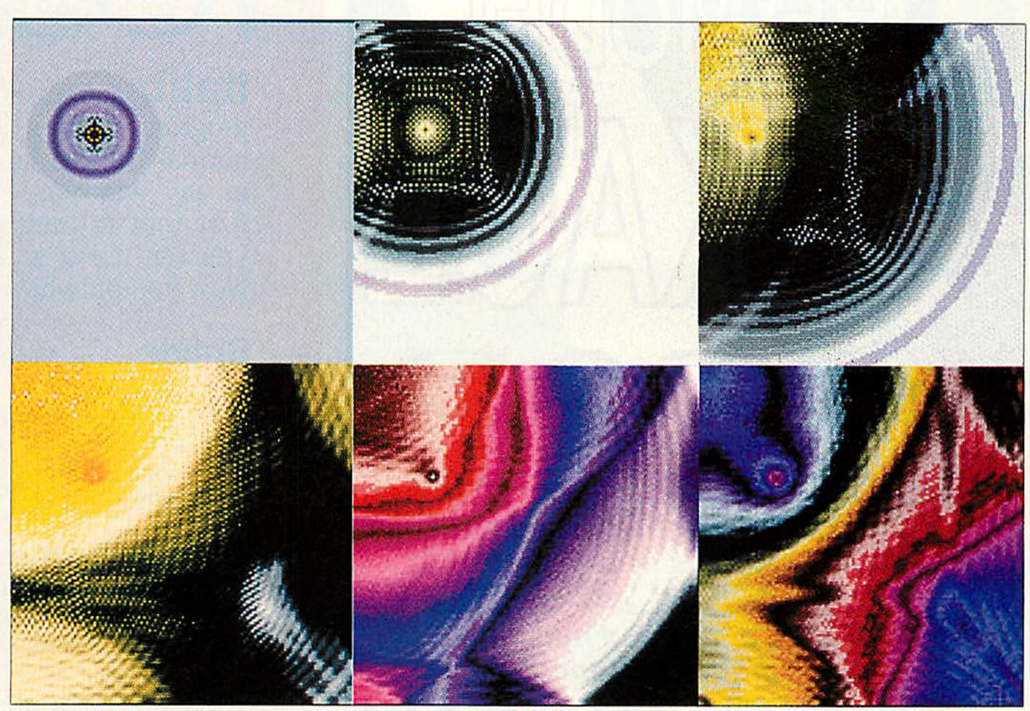
The keys Z and X roll your space vehicle and * and ? speed it up and slow it down. Richard and Matthew make use of a frightfully cunning multiplication routine which allows allow the program to run at a decent speed.

Regular readers should remember Richard and Matthew who, not only published a couple of one-liners last month, but also an eight-bit water drop simulator.

First off the mark is an eight-bit version of an Archimedes ditty that appeared a number of months back. In the Archimedes world. It was nothing special – it merely animated a number of particles, using some simple maths to create a 'flying through hyperspace' effect.

Richard and Matthew decided that it must be possible to create a similar effect on the BBC. Their efforts are reproduced on the yellow pages.

3Dstars is predominantly written in machine code although a number of tables are used to speed up some of the more complex mathematics. In the Archimedes version, the sines and cosines were 'shifted up' by 20 bits so as to preserve some degree of accuracy when multiplying.



Waves spreading out from a central point: just one sequence in the Waves application

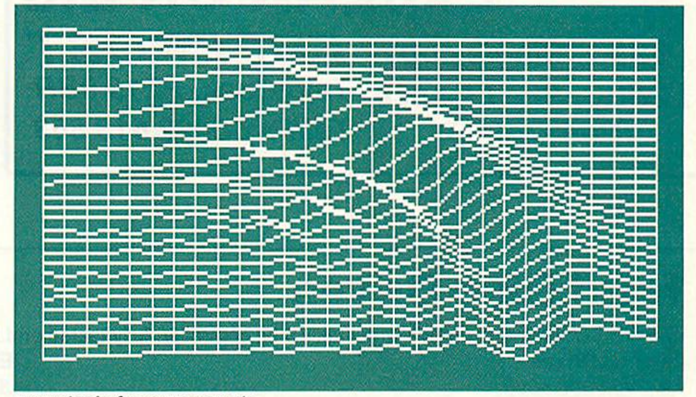
Obviously, as the 6502 has no multiply instruction, 16-bit multiplication is a bit on the slow side especially when animating 64 stars!

The BBC version therefore uses two tables for each trigonometrical function; the magnitude of the value in one table and the sign (positive or negative) in the other. This way, a sine (or cosine) accurate to eight bits can be calculated using only an eight-bit multiplication routine.

This value is then added to, or subtracted from, the coordinates of the centre of the screen depending on its sign. According to Richard and Matthew, the multiplication algorithm was taken from an A level computer science textbook and neither of them can fathom out how it works.

As mentioned in the introduction, Z, X,* and ? can be used to vary the movement of the stars. An interesting point to note about the program is the highly 'illegal' way it checks for key presses. If you take a look at the routine key, you'll see that it reads the keyboard directly from the hardware register at &FE41.

This way, no operating system calls are used in the main loop, thus speeding up execution and making the demo run more smoothly.



A 3D ripple from WaveBasic

WAVES

Programs: WavesBasic, Waves
Description: Graphic demo
Author: Michel Grimminck
Machine: 32-bit
Listings: 60 lines Basic, 160 lines Basic and Arm code

Liquid simulations are still very much in vogue. This demo makes excellent use of the palette to produce a striking effect.

The Basic program *WavesBasic* and the machine-code version *Waves* share the same principle. Although the effects they produce are very reminiscent of the patterns produced in wave tanks, Michel says that 'technically, *Waves* simulates a vibrating plate with loose ends'.

The 'plate' is made up of a grid of points, each with a height and a velocity. Before each frame is displayed, the velocities of all the points are calculated using the formula shown (below left). Then, the new heights of all the points are calculated by:

```
height(x,y)+=velocity(x,y)
```

In *WavesBasic* the heights are used to plot a simple wire frame picture, but *Waves* uses the height to choose an appropriate colour from a table.

WavesBasic simply asks the size of the grid. *Waves* requests more information: the grid size (logarithmic, so 6 means 64 by 64, 7 means 128 by 128), the friction (how fast the waves die out) and the velocity (the tension in the

```
velocity(x,y)=(1-friction)*(velocity(x,y)-tension*(4*height(x,y)-height(x-1,y)-height(x+1,y)-height(x,y-1)-height(x,y+1)))
```

The velocity formula for Waves



Create your own

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plate, which defines how fast the waves are transmitted). The friction is logarithmic, so increasing it by one will cause the waves to die down twice as fast. Velocity/tension is also logarithmic. Increasing this value by one will increase the wave velocity by 1.41 (meaning SQR(2)).

To set the waves moving shift the mouse up and down, but be gentle! In *Waves* you can alter the scale of the wave heights by clicking with Select and Adjust. Menu returns you to the default setting.

SCROLL7

Program: Scroll7
Description: Graphic utility
Authors: Matthew Godbolt and Richard Talbot-Watkins
Machine: 8-bit
Requirements: Not Electron
Listing: 220 lines 6502 code

This program makes use of the apparently limited graphical facilities of Mode 7 to produce a large 'scrolltext'. Mode 7 'Pixels' are used rather than full character cells and this produces a message that is easy to read, but not too large so that only a couple of characters are visible at once! The message is scrolled as a background task, so you can continue using your machine if you wish!

You'd be forgiven if you thought that our second contribution from Matthew and Richard had been done before. The idea has, but we felt that their version was suitably different to warrant inclusion.

The main part of the code runs under events, effectively making it a background task allowing you to use the machine as if nothing was happening – who said the BBC couldn't multi-task! To use the program, run it first to save the machine code (it will be called *7Scroll*), then create a text file containing the message you wish to display. This can contain any printable alphanumeric character including space.

The final character should be a 'Return' character (Ascii 13). This file should then be loaded into any spare area of memory. Put the address of this area in the memory locations &70 and &71. The simplest way to do this is with !&70=address. Then all you need to start the scrolling is to *Run 7Scroll. Once running, the message can be stopped by typing *FX 13,4 and restarted with *FX 14,4.

If you want more details, *Scroll7* is the subject of this month's line-by-line box shown above.

LINE BY LINE

This month, Matthew and Richard's Mode 7 scrolltext program goes into the operating theatre for a post mortem. If you would like to read the blow by blow account of how this program works, please read on!
140 Define zero page memory locations used by the program.
260 Define operating system vector and routine names.
300 This line defines the start line on the screen of the scrolltext. A Mode 7 graphics character is made up of 6 'chunky' pixels in a 2x3 block. The BBC's characters are 8x8, so three screen lines are used with the top row of 'pixels' left blank.
320 FOR loop for two-pass assembly
330 Where to assemble the code
340 Inform Basic that machine code follows
350 Define a label
360 Check if the routine is already installed and exit if so.
390 Install our event by pointing the event vector to the code.
440 Start up event number four (line 450), the start of vertical sync.
480 Keep a copy of the address of the message.
510 Initialise the bit variable. This keeps a track of how far across each character we are.
530 Poke 'graphic on' codes on to the start of each line that is going to display text
570 End of setup – return to Basic
590 Start of the real code within the event
600 Read the next character from the message using indirect memory addressing
620 If it wasn't a 13 (if it was, then lines 640 to 680 are skipped) then the original pointer to the message is copied back and the first character re-read. This allows the message to wrap round.
700 The Ascii code is stored and OSWORD 10 is used to read the character's definition. This returns the eight binary numbers whose bits make up the representation of the character itself. These eight numbers could be fed straight into VDU 23,n to define character n.
750 The X register is set to the bit position reached so far.
770 These bits of code scroll the screen and plot the characters, lines 770-890 scroll the top line (the top two pixel rows). Lines 900-1040 deal with the middle line (rows 3, 4 and 5) and lines 1050 to 1190 handle the bottom line (rows 6, 7 and 8). The structure of each of these is identical, so we will only cover one of them in detail.
770 The locations in1, in2 and in3 contain the bits (either 0 or 1) for each of the (vertical) pixels on each character row. In the first case in1 is set to zero because the very top line is always blank.
790 A call to getbit is made to extract one bit from the character defintion. In this case from chardef+1 or the top line of the character definition. getbit is covered below, but returns the bit X places from the left.
810 Shift this bit up 3 and store it in in2
850 As above, but extract bit X from chardef+2, shift it up 6 places and store it in in3. If you refer to page 155 of the basic user guide, you will see how a mode 7 graphics character is constructed. The shifts above correspond to multiplying by 8 (3 shifts) and 64 (6 shifts) – the values of the pixels down the right hand side of the character. In this case the top line is always zero, if you look at lines 900-930, you'll see that the top row is multiplied by 2 (one shift).
890 This is as near as Basic 2 allows you to get to a 'macro call'. This allows a piece of code to assembled a number of times without having to type it out each time. FNshift scrolls 39 characters starting at the address given. We will jump and look at this now.
1960 Set up a count of 39
1970 Define the start of the loop
1980 Read a byte from the screen (in the first case this will be the rightmost character on the line), shift it (by calling the subroutine shift) and store it back on the screen.
2010 Decrement the count and loop back if there are any more characters to process
1550 shift – the routine that scrolls the graphics.
1560 Store the character at temp.
1570 Find the state of the pixels that will be scrolled off...
1570 ... the top row (bit 0)
1600 ... the middle row (bit 2)
1620 ... and the bottom row (bit 4). These are stored in out1, out2 and out3 respectively.
1650 The value is shifted right to scroll it and tidied up, this involves making sure no untoward bits creep in and none disappear! Bit 1 moves to bit 0, bit 3 moves to bit 2 and, the tricky bit, bit 6 moves to bit 4. Bits 5 and 7 must always be set (line 1720), and the right hand column bits must be cleared (line 1730)
1740 The new bits are included within the new characters.
1780 The bits that fell out of the character are shifted ready to be included in the next character.
1780 the top line
1810 the middle line
1840 the bottom line
1880 Finally, the new character code is returned.
Back in the main loop...
900 Scroll middle line
1050 Scroll bottom line
1210 Move to the next bit
1220 See if we've dealt with all bits (there are 8) if we have, then:
1250 Reset the bit counter to zero and
1270 move on to the next character in the message.
Subroutines...
1330 .getbit returns a single bit from a byte. It uses the 'masks' at .masktable. These contain the binary numbers that represent a single bit in each position. By AND-ing the number with the mask it is possible to work out if...
1360 the bit was clear and return a zero or
1390 the bit was set and return a one.
1460 Routine to multiply by 64 to shift the bottom pixel row bit.
1550 The shift routine as described above.

CLASH UPDATE

Program: Clash
Description: Utility
Author: Tris Mabbs (original), Cliff Blake (update)
Machine: Eight-bit
Listing: 70 lines Basic

Cliff Blake has updated Tris Mabbs' utility to check that your INKEY key combination values don't clash!

As you may know, when detecting keys using INKEY there is the danger of certain key combinations clashing. Therefore, when writing games and so on, you must carefully select the keys to use so no combination will cause

'phantom' keypresses. A utility by Tris Mabbs was reprinted in Eight Bits in the June 1992 issue. Cliff Blake has updated the program – *Clash* – to support the extra keypad keys on the Master. The listing is short so we've included the whole revised program.

When run, a grid showing all possible keys is displayed in white. Press the keys you intend to use one-by-one. They will be highlighted in green. Any keys that become red may not be used in your program, as they might be 'faked' by combinations of the other chosen keys. Symbols prefixed with p are keypad keys. b0-b7 are the start-up links on the BBC Model B. For understandable reasons, you can't Escape from *Clash* so you must use Break.


Aura is the latest offering for one-liner fans

DATEFIX

Program: DateSrce
Description: Risc OS bug-fix
Author: J B Pickard
Machine: 32-bit
Listing: 120 lines Arm code

After a power-on reset the Arc has a slightly unfortunate habit of resetting the year to the range 1988-1991. This utility gets around the problem.

Firstly, apologies to Mr Pickard for not including this utility earlier in the year! Since 1992 began a bug in Risc OS became apparent.

When resetting the machine by holding down R or DELETE when switching on the Arc the time mysteriously moves back to 1988. In fact, it seems that all but the bottom two bits are discarded.

Mr Pickard's solution takes the form of a small application called *DateFix* which should be placed somewhere it can be seen by the filer (for example, in $ itself). The program *DateSrce* creates a file called *!Run* which should be put in *!DateFix*. Also, you must now create an obey file with the following line and save it in *!DateFix* as *!Boot*:

```
<obey$dir>.!Run
```

If you like you can create a sprite called *DateFix* and save it as a *Sprites* file in the directory.

The application is run as soon as it is seen by the filer and immediately checks to see if the last reset was a power-on type. If so, the current date is checked against the datestamp of *!Run*.

If the machine's year is less than that of the file, four is repeatedly added to it to bring the year back in the correct range. If the year is greater than that of the file's stamp (and it's before the 14th January) the datestamp is updated so as to reflect the new year.

Mr Pickard points out that care should be taken to ensure the date is correct when the *!Run* file is first created, so the process starts off correctly.

ONE-LINER

Program: Aura
Description: One-liner
Authors: Matthew Godbolt and Richard Talbot-Watkins
Machine: All
Listing: One line Basic

And finally, a little graphic one-liner for all machines from Richard and Matthew known as *Aura*. Above, you can see the colourful results.

OVER TO YOU

These pages are composed entirely by readers just like you! We are happy to feature all kinds of programs, from silly one-liners to indispensable utilities.

And we offer monetary rewards for the best ones. So get the grey matter working and put fingers to keyboard. The address to write to is ✱INFO, *BBC Acorn User*, Redwood Publishing, 101 Bayham Street, Camden, London NW1 0NG. Your program should be on disc with a short description of what it does.

✱DISC

The August disc contains all the programs from the magazine as well as a few extras for 32-bit owners. There's a suite of graphic demos from ✱Info regular Jan Vibe and a plethora of wise words from a 'fortune cookie' application by John Robinson. Below is a cityscape, also from Jan Vibe.



TIP OF THE MONTH

Hal Bertram offers a one-line desktop calculator. Normally, you can only work out integer sums using the command-line interface from the desktop. If you want to find SQR(2) you have to enter Basic, use PRINT and *QUIT again. Save this one-line Basic program in your library as '=':

```
10 SYS "OS_GetEnv" TO a$:PRINT "Result: "; EVAL(MID$(a$,19))
```

Now, from the * prompt you can type:

```
= 250*SIN(RAD(45))
```

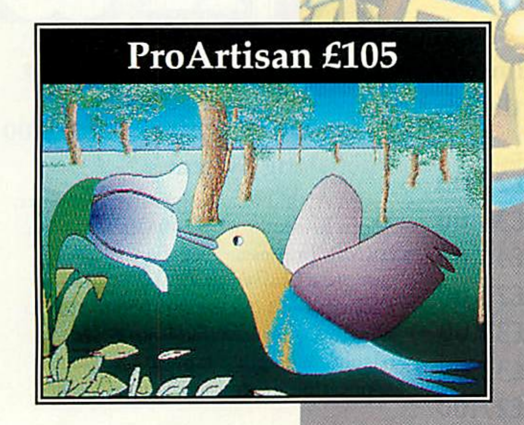
and get the right answer!

Theo Markettos reminds us that there is a quick way to merge two Basic programs without using *SPOOL (as we mentioned in the May 1992 issue). To add *InputLib* to *MyProg* you can use the routine:

```
LOAD "MyProg"
OSCLI("LOAD InputLib "+STR$~(TOP-2))
```

GRAPHIC PROGRAMS TO BRING LIFE TO YOUR PICTURES

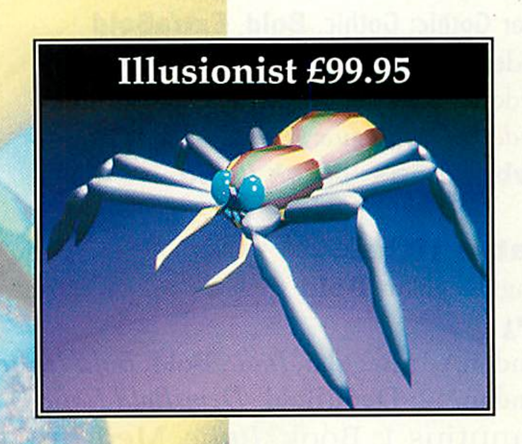
ProArtisan £105



First there was the *Artisan* and *ProArtisan* series – still the most widely used art packages in education today. They feature an intuitive icon based menu system that has proved usable by children as young as three years old. Yet they are powerful enough to be used by serious artists.

Artisan is in its second generation *(Artisan II)* and provides many useful and unique features. This is the one for younger children and anyone interested in textile design. ProArtisan is a more sophisticated package but retains the familiar interface of Artisan II – an easy upgrade path.

Illusionist £99.95



No, this isn't a bird eating spider and no *Illusionist* doesn't replace *ProArtisan. Illusionist* is a graphics package for those who don't have the skills or inclination for free format painting.

With *Illusionist* you create a wire frame outline of your image using pre defined shapes. In addition you can define your own shapes or distort any existing shapes. This makes it very easy to generate images even if you can't draw a straight line. You can assign colours and textures to your objects. You can even give them texture maps. A texture map is any Mode 12 or 13 screen. So you can use a scanned or digitised image, a painting – literally anything!

Render Bender II £99.95



NEW REDUCED PRICE

Render Bender II is another top rated graphics package from Clares. Images are created in a similar way to *Illusionist* by defining objects using pre defined shapes. You then add colour, texture, lighting etc. *Render Bender* images can include glass and mirror objects as well as shadowing. *Render Bender* actually calculates the path of light from its source to the imaginary eye at the viewing position. This path takes account of any reflections and refractions.

In addition *Render Bender* can create animated sequences very easily. You can either give objects a formula to control their movement or you can give start and end positions and ask the program to 'in between' the other frames. The result is a stand alone animation that can be passed to friends or even sold.

Titler £149.95

This shows a graph from !Plot loaded into Titler.

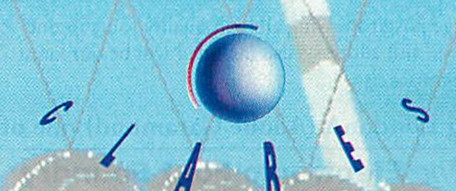
We can have Rubout boxes

Underlined text

Finally we have *Titler.* This is a video titling and sequencing package. The *Titler* program uses outline fonts enabling you to create text screens, credits etc. You can have any colour text, background, drop shadow, underline or rub out boxes. You can also include sprites and Draw files in your screen.

The *Titler* screens can be used in the *Sequencer* program along with screens from *Artisan, ProArtisan, Illusionist* and *Render Bender,* as well as lots of other formats. You can also include *Render Bender* or *Euclid* animations, *Tracker* tunes, *Armadeus* samples or Archimedes samples in your sequence. *Sequencer* gives you total control over the display of the screens and provides many effects to switch from one screen to the other. As well as being a tool for video titling this package can be used purely as a presentational tool for preparing and showing lecture notes, demonstrations etc. In fact all of Clares demos are now created using *Titler* and *Sequencer. Please request a demo disc that will illustrate the potential of these packages.*

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TIME FOR C

This month, Dave Acton supplies BAU readers with the final version of an easy-to-use time manager

This month we give you our final version of *Timely*: a complete desktop application written in C, that can be used on a day-to-day basis. Many features have been added to make *Timely* an efficient time-manager, that can sort out your work appointments, help you stick to deadlines and make sure that you never miss a birthday.

Timely is an easy program to use, and subscribers can try it out immediately by loading it from their monthly disc. Those who are copying in the program from yellow pages need to enter a new version of *c.Timely* and update some of the files given last month, namely *c.DrawUtils* and *c.FontUtils* found in *$.UserCLib*.

If you are using Acorn's C release 4, you will need to alter these files slightly. Some of the definitions need to declared in a rather different order and so the #include commands at the start need to be shuffled. The listings *DrawUtils+* and *FontUtils+* contain the amended lines. Only the first few lines of the files are affected.

TEMPLATES

The template file needs to include a window definition called Query. You can either create a new complete template file by entering and running *MakeDat2*, or simply merge the Query window (from the template file supplied with C) with that of *Timely*. The file containing the appointments is slightly different in format to last month. Again, *MakeDat2* will create a suitable empty Diary file, but you can edit it by hand. An extra line reading 1992 1993 should be added immediately below the -1 with *Edit*.

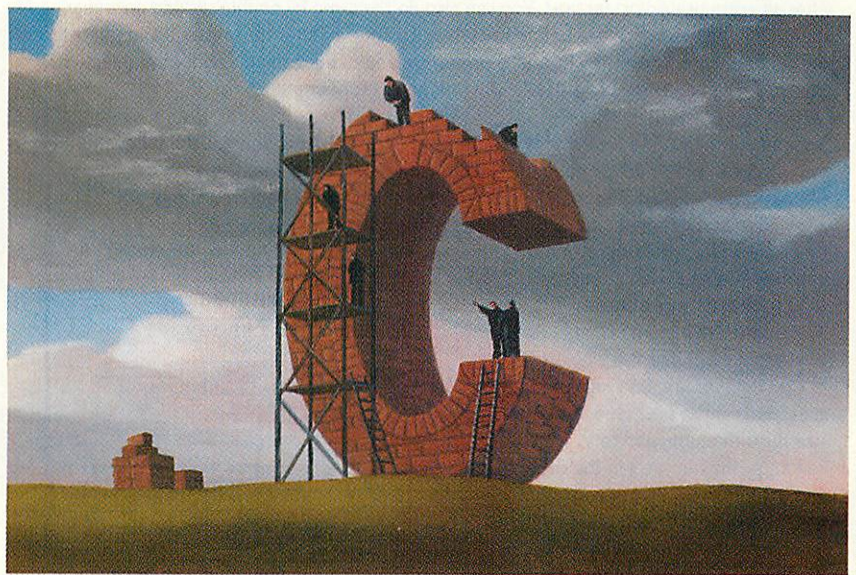
Another change this month effects c.Memory. A bug was found in the routine ensure_memory(). The corrected routine is listed as Memory+. Bug number two turned up in the string comparison routine c.UserLib and the correct version is listed in full.

When you think you have all the correct files ready, compile the program as instructed last month. You may want to refer to last month's article which gave the overall directory structure. All being well, a sparkling new *!RunImage* should appear and *Timely* is ready to go!

C.WIMP

This library offers routines to supplement the standard Wimp library. The routine wimp_utils_init() must be called before any of the other subroutines. A global array is defined (winfo[]) which holds details for each of the windows you declare. The array is of type window_info: a structure that contains the window's handle, flags saying whether it is open and if it should be deleted when closed, and information about an optional pane to which it may be attached.

A handle i is returned for each new window created with wimp_utils_create_window and the window's details are held in winfo[i]. The routine wimp_utils_front() is used to open or reopen a window, either in the centre of the screen or at a 'free space'. In the latter case, two parameters are supplied (par1, par2) which are used as x and y steps. The screen is examined in these steps until a suitable empty space is found for the window. This is a useful way of opening a toolbox where it won't obscure another window.



ANGUS MEWSE

Other routines exist to handle icons – selecting one from a group, setting the textual content of one and so on.

C.DRAWUTILS

This library provides routines for dealing with *Draw* files. They are used extensively by *Timely* and draw_utils_init() must be called at the start of your program. A memory block is set up called draw_utils_obj. This will contain any *Draw* object you create, before its inclusion in a diagram.

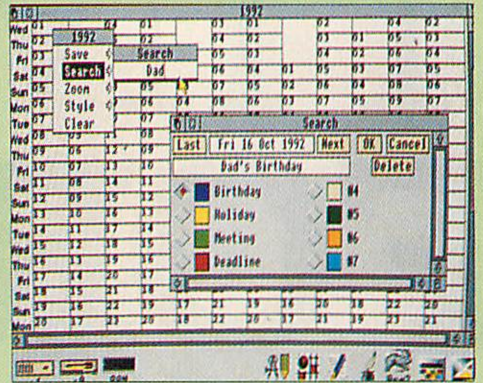
Many *Draw* files will include fonts, as those in *Timely* do. An empty font list is simply a list of font names, each with a reference number. This is created with draw_utils_begin_font_list(). Thereafter, each font may be added with add_font_to_list() which takes as its only parameter a pointer to a font_desc structure.

When complete, the list can be added to a *Draw* diagram using add_draw_object(). This call is used to add any type of *Draw* object. Its parameters are a pointer to the memory block holding the diagram, the address of a variable of case draw_object (where the offset of the newly added object will be placed), where the object is to be inserted, and a flag to say whether the object should be verified after insertion.

Rules (or paths) are added to *Timely*'s viewers

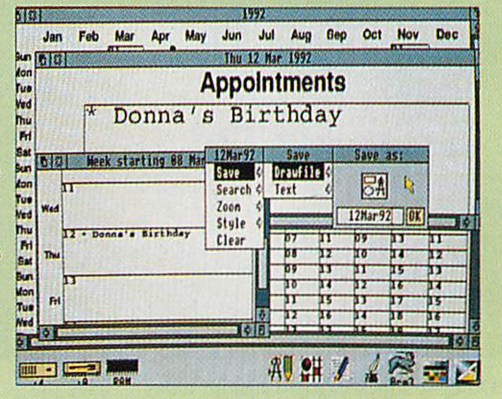
USING TIMELY

Many new features have been added to *Timely* this month, so here is a walk through guide on how to use the application. Install by doubling-clicking on *Timely*. To bring up the current year click on the *Timely* icon. The *Timely* icon menu has been extended and provides the following sub-menus: Info supplies the user with information about *Timely* and Save allows the user to save the whole diary. Open will open the viewer for the year of your choice, Range allows you to set the first and last valid years (1970 to 2046 by default) and Options lets you saves the font styles selected for viewers in <Timely$Dir>.!Config or reload the saved styles. When you have brought up the year viewer you require, double-click on the day or month you wish to see. To add an entry, double-click on a day viewer with Select – to alter an entry use Adjust instead. You can also do the same by double-clicking on a year, month or week viewer while holding down Shift. Enter or alter the message and select the appropriate type. There are eight to choose from and in our example above we selected birthday. Then click OK. Press Delete will remove an appointment.



A menu appropriate to a viewer can be brought up with Menu. This has the following options: Save allows you to save the current viewer as a *Draw* file (shown in our screenshot) or as text. The search option is used to look for an entered string. You will be allowed to edit or delete any messages that contain the string entered. You can also use Last or Next to skip between entries.

The purpose of zoom is obvious: it magnifies the viewer in the standard Risc OS way. Style is used to set the font type and size for the column and row headings, the numbers in the cells and the messages themselves. and Clear is used to delete all entries in the viewer. If you wish to save the contents of a viewer as a *Draw* file, you can do this directly to *Draw* or another application, but you cannot reload *Draw* files. On the other hand when you choose to save a viewer as text, the type of viewer (year, month, week or day) is recorded in the text file and you will only be able to reload the file on to a viewer of similar type. This allows you to save sections of the diary or copy entries between years, months and so on. For example, you might like to copy all birthdays and other yearly events from 1992 to 1993. To do this, make sure that these are the first things you enter in the diary. Then set the last year to 1993 (using the icon bar menu) and bring up the 1993 viewer. Now save 1992 as text on to 1993. All dates will be copied.



Lastly, you will probably want to customise the eight event types to your own needs. To do this, simply edit the last eight lines of the text file *!Config*.

WHAT NEXT?

C is the development language recommended by Acorn and for good reason. It is a high level language which is well supported by a multitude of standard routines. Yet it compiles into efficient machine code. Naturally we cannot cover everything in the space of these articles but, hopefully the combination of a book on C and our *Timely* example, should inspire you to experiment further with this useful language.

using other routines. An empty path is created with begin_path_obj() taking parameters describing the nature of the path (fill colour, size of caps and so on). Then add_move_to_path_obj() and add_line_to_path_obj() are called to insert the actual line segments, followed by end_path_obj() to close the object. Then add_draw_object() is called to include the finished item, as before.

One final call is particularly useful to *Timely* – add_text_box(). This takes a host of parameters and creates a box of text in a certain font, with horizontal and vertical justification. The coordinates of the box are provided and the routine works out how big the text is, and places it accordingly. Have a look at *C.Timely* for several examples of this.

TIME

Ansi C has standard routines to deal with time. Time is generally stored in one of three ways – as a single number of type time_t, as a structure called tm, or as an Ascii string. Each type is suited to certain purposes and so standard routines to convert from one type to another are used extensively in *Timely*.

For instance, each viewer has a start and end time and these are stored in its entry in the viewer array as time_t values. The library routine difftime can be used to work out the difference in seconds between two time_t values, so this format is useful for finding out which appointments lie on a certain day.

But these single values are far too simple! Human time is counted in years, which usually have the same number of days in them, the years divide into twelve months and then, to cap it all, there are a random number of days to each month. Working out that 12 March 93 is a Friday is not an easy task, but once again C library routines come to the rescue.

The program can convert a time_t value to a structure called tm which holds the year, month and day number, as well as useful information like the day of the week (0=Sunday to 6=Saturday). After cheating a bit, you can work out how many days there are in a particular month, using the library routines.

Say the variable t (type time_t) marks the start of February. Simply convert this to the tm structure using the localtime call. Now doctor the month number by adding one to it, and convert back to a time_t value using mktime(). You can set the values in tm to illegal values – they will be corrected by mktime(). So to work out what the date will be in 10,000 seconds time, simply add this to the seconds element of the tm structure and mktime() will sort it out for you.

Of course, neither of these formats is particularly friendly so conversion to English is permitted with strftime(). This is very like the Arc's OS_ConvertDateAndTime call – fields prefixed with % mark the format in which you would like the time and date. A format string of "%B %d" might produce "October 16" whereas "%d.%m.%y" might give "16.10.94".

SAVING AND LOADING

In Basic, data transfer is a fiddly business, but there are standard ways of doing things in C and *Timely* illustrates these nicely. Saving is performed by two user supplied routines, passed to saveas() which is called whenever a Save box is needed. One is used for file transfer, the other for direct memory transfer between applications. The latter is optional, but *Timely* supports both. Global variables are used to flag the type of save (either text or a *Draw* file) and other details. When saving to a file, our old friend OS_File is used after a few checks. For direct memory transfer, the data goes into a temporary memory block and shifted in a loop.

Similarly, files are loaded with OS_file and data transferred directly passes first into a temporary memory block and then into the diary. Separate memory blocks are used for in and out which means that *Timely* can copy appointments from one day to another.

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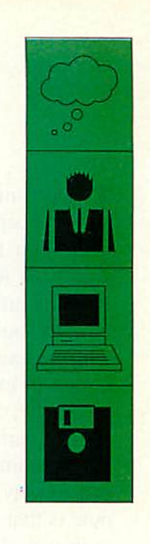
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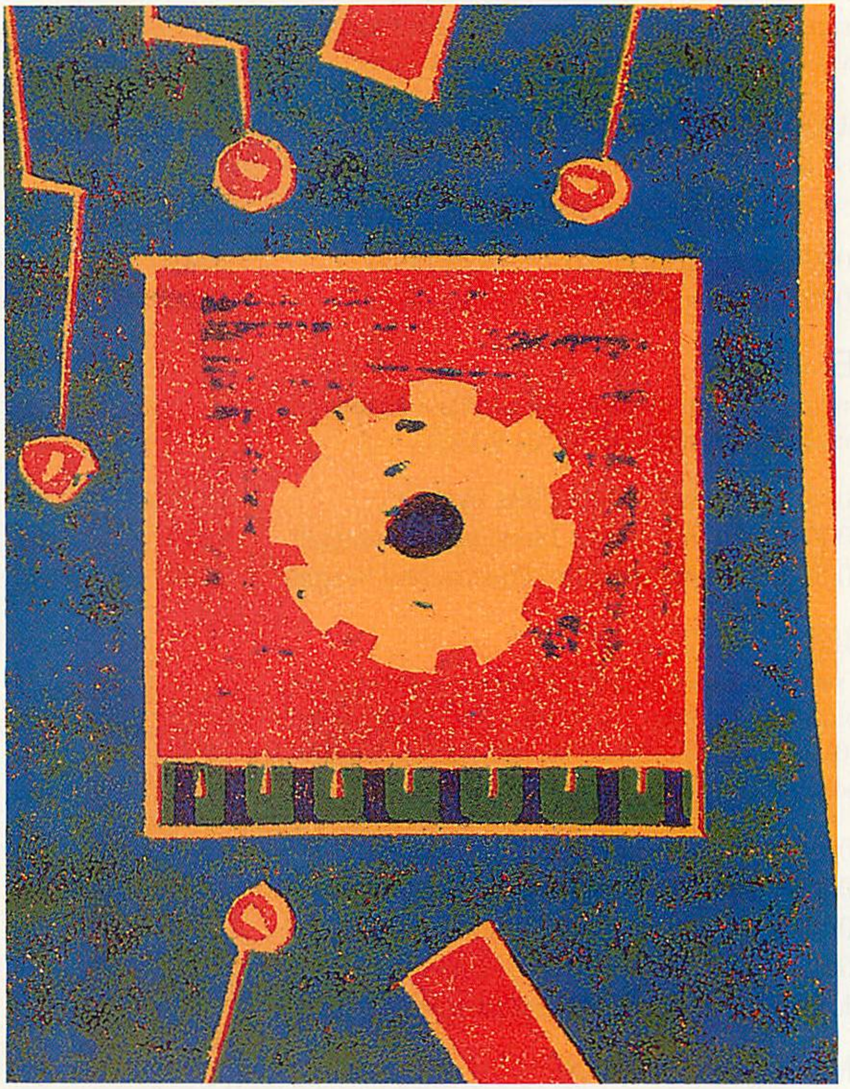
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PAUL SCHOFIELD

ASSEMBLY LINE

More on conditional branching, as DAVE LAWRENCE continues his introduction to Arm code

Last month I introduced the important concepts of comparison and branching. With these it is possible to create all the high level structures of languages such as Basic. Starting from a simple IF THEN, I showed how to 'build' a FOR NEXT loop and I finished with an example that showed that loops can be nested in exactly the same way as Basic. Fairly obviously, by changing the value added to the control variable you can simulate the effect of a STEP parameter. I'll leave that as an exercise for you to play around with. One important thing to note is that in order to accurately simulate a FOR loop you should use the BLE example from last month. This also ensures that the loop will actually terminate. If you were to code the Basic line:

```
FOR i=0 TO 9 STEP 2
```

. . . using a BEQ, you'd have a nasty surprise – the register would get the values 0, 2, 4, 6, 8, 10, 12 and so on, never equalling 9! With a BLE, the loop will finish with a value of 8 because 10 is not less than or equal to 9.

As we have seen, the condition codes built in to the Arm allow simple IFs to be coded very neatly indeed:

```
IF R0=R1/2 THEN
 R1=R1*2
ELSE
 R0=R0+1
ENDIF
```

Translates to:

```
CMP  R0,R1,ASR #1
MOVEQ R1,R1,ASL #1
ADDNE R0,R0,#1
```

Most multi-part THENs can be coded by simply adding extra conditionally executed instructions. However, there comes a point when this becomes impractical or impossible. Just about all the instructions we have met so far take the same amount of time to execute, one so-called 's-cycle' on an 8Mhz Arm 2 chip (fitted in 300/400 and 3000 series machines) these take 125 nanoseconds (not very long!). The addition of a condition code doesn't add anything to this time but, more importantly, doesn't take any time away if the instruction is not actually executed because the result of the condition was false. It may therefore be undesirable to place a whole string of condition coded instructions in a time critical loop. It is best to resort to 'old' techniques and branch round the code if the reverse condition is true – for example:

```
CMP R0,R1
BNE skip
....
(code if R0=R1)
....
.skip
```

Here, we want to execute some instructions if R0 equals R1. As an extension to this, you might well have a complicated multi-line IF ELSE ENDIF to code. In this case you'll need to use something like this:

```
CMP R1,R2
BEQ equal
(code if R1<>R2)
B continue
.equal
(code if R1=R2)
.continue
```

As mentioned above, such coding will also need to be used in cases were it is not possible to string together condition codes. The obvious example where this is the case is when you need to include a second IF within either the THEN or the ELSE. Here, this IF will alter the state of the processor flags thus making the execution of subsequent instructions dependent on it rather than the original IF. In the short term this is what we want, but eventually we'll get to the ELSE

and the flags will be up the spout. What in fact you get in this case is a short cut for doing ANDs and ORs – more of this in a bit . . .) By using the templates above, though, you'll be able to get round this problem.

Pick and mix

Often you'll want to make the execution of a THEN conditional on the result of more than tests:

```
IF k$="a" OR k$="A" THEN . . .
IF a=5 AND b=c THEN . . .
IF t>50 AND t<100 THEN . . .
```

A general format for translating ORs is to perform the various tests needed, and branching to the start of the THEN if any of them are true. An extra branch round the code is also needed if none of the conditions were true:

```
CMP R0,#ASC"a"
BEQ chara
CMP R0,#ASC "A"
BEQ chara
B nota
.chara
(code for THEN)
.nota
```

A good optimisation here would be to reverse the 'sense' of the final test and lose the B nota, giving:

```
CMP R0,#ASC"A"
BNE nota
.chara
```

A similar process can be adopted for ANDs:

```
CMP R0,#5
BNE nogood
CMP R1,R2
BNE nogood
.label
(code for THEN)
.nogood
```

Note that the 'sense' of each of the individual comparisons has been reversed. I said earlier that there is a short cut for AND and OR. This can't always be used, but both the above examples can be simplified:

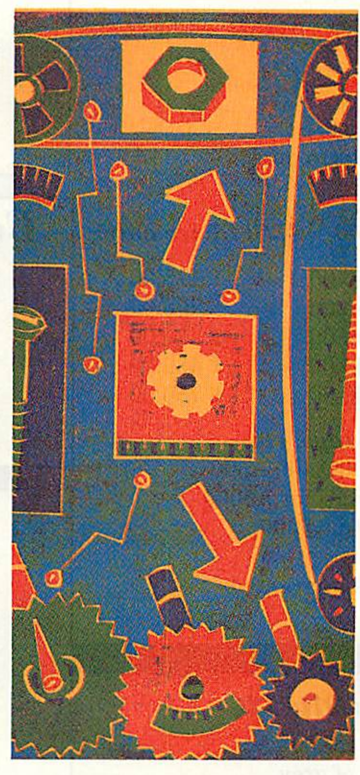
```
CMP   R0,#ASC"a"
CMPNE R0,#ASC"A"
BNE   nota
(code for THEN)
.nota
```

Reading this in 'English' it means 'if R0 is not a little A then if R0 is not a big A then (jump to .nota)'. If the code for the then was only a couple of instructions, you could even get rid of the .nota completely, and simply add a EQ condition code to your THEN instruction. The AND example reduces to:

```
CMP   R0,#5
CMPEQ R1,R2
BNE   nogood
(code for THEN)
.nogood
```

Again, the BNE could be changed to an appropriate 'EQed' instruction for extra compactness.

Often you'll need a FOR loop simply as a way to execute some instructions a certain number of times, the actual value of the control variable at any time is not relevant. In the example last month that simply printed ten stars, we were only interested in getting those ten stars displayed, we were not in the least bit interested that the value of the control variable went from one to 10. It could have quite as easily gone backwards from 96 in sevens!



CONDITION CODES	
EQ	Equal
NE	Not equal
LE	Less than or equal
GE	Greater or equal
LT	Less than
GT	Greater than
LO	Lower than
HI	Higher than
LS	Lower or same
HS	Higher or same
MI	Minus
PL	Plus
CS	Carry set
CC	Carry clear
VS	Overflow set
VC	Overflow clear
AL	Always
NV	Never

This conveniently brings me on to another way the status flags can be set by adding an 'S' on to the end of any mathematical operations (ADD, SUB, etc.) This sets the flags according the result of the operation. The most useful upshot of this is that if the result was zero, the zero flag (Z) is set. As you should remember, the EQ condition code is 'true' if the Z flag is set – EQ actually means equal to 0 (why this can be used for comparing numbers will be revealed later on!). If we therefore count backwards we can remove the need for an explicit CMP. Without this instruction the code is therefore a little more compact and will execute just a tad faster.

If you take a look at *Arm1* on the yellow pages, you'll see a version of the ten stars program that uses this technique. Line 130 initials the control register to 10 – the number of stars required. Line 150 prints the star (as before). Line 160 decrements the control variable and sets the Z flag if it becomes zero. Line 170 branches back if the Z flag is clear (i.e. in all cases except when R1 becomes 0). As an exercise, try adapting last month's 'mystery' program to produce exactly the same result but using downwards counting loops.

Making conditions

As promised last month, here is run down of all the condition codes (well, most of them!) and what they mean in 'English'. So far we have met EQ and NE (equals and not equals) and LE (less than or equals). Most of the others are pretty self-explanatory and easy to guess. LaE has 'companions' GE (Greater than or Equal), LT and GT (Less Than and Greater Than) respectively. These four work with signed numbers (i.e. negative, 2s complement format ones), so -1 is less than 2, even though -1 is all ones in binary which could be thought of as larger than 2! If you want to perform comparisons on unsigned numbers than the four codes to use are LO (LOwer), HI (HIgher), LS (Lower or Same) and HS (Higher or Same). You can test for a number being negative with the MI code (MInus) or positive with the PL code (PLus). Note that zero is viewed as being positive. CS and CC check for the carry flag being set and clear, similarly VS and VC work on the overflow flag.

The final two codes are a little odd, they are AL and NV. These are short for ALways and NeVer. An AL coded instruction is always executed and an NV one is never executed! In fact, all 'plain' instructions (with no condition codes) are actually AL coded. Practically all assemblers will automatically (and invisibly) add the AL for you, likewise disassemblers will strip off the AL.

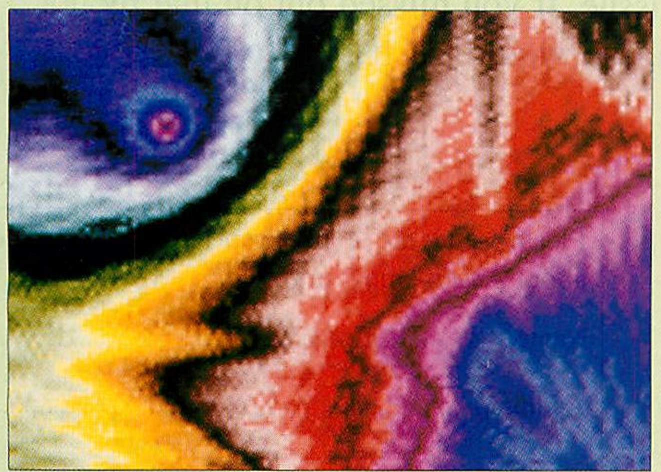
NV is a little bit of an orphan as it doesn't really have any practical use. Acorn used to recommend using the instruction MOVNV R0,R0 as a no-op (no operation or time-filling instruction). Now they are discouraging people from using NV altogether (MOV R0,R0 is now the accepted no-op), If you use *MemoryI on Risc Os 3, it will warn you of any NV coded instructions.

Next month, something different, so watch this space!

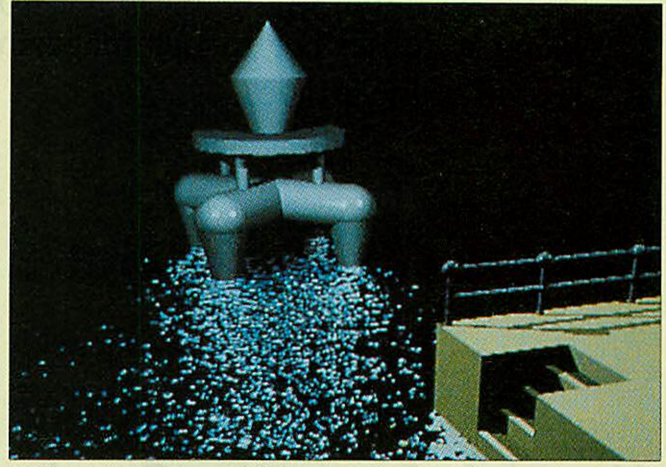


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DIARY PRODUCT

Dave Lawrence rifles the BAU archives and finds a quick way to count the days

To coincide with Dave Acton's desktop diary program we though it appropriate to wummage awound in the undergwoaf and see what we could find in the *BAU* vaults suitable for eight-bit users. Without too much trouble, we came across *Hemera* by Rupert Thompson, from January 1990.

Hemera is a diary management program that can produce hard copy in a number of styles and which will automatically include fixed (and moving) 'special days' such as birthdays, bank holidays, saints' days and Easter. The relevance of the name? That's easy! *Hemera* is the Greek word for 'day'.

Hemera starts up with a simple to use nine-option title page. All choices are made simply by pressing the appropriate function key. Before you can do anything you must have created a diary by pressing F5. This will ask for a file name. If you already have a saved diary you can open it by pressing F0 and entering its filename.

To read your diary and possibly add information to it press F1. The screen will clear and you'll see one day of the diary. This contains the date, any special 'significance' of the day (birthdays etc.) and up to ten lines for your own appointments and reminders.

The left and right cursor keys turn the pages of the diary, taking you backwards and forwards a day at a time. To jump to a specific date press G (or F3 from the title screen). To edit the title field press TAB or COPY to edit the ten personal lines. Once editing, COPY deletes the entire line, TAB restores it and RETURN or the up and down cursor keys will fix the line in place and move the cursor.

A simple search facility is built in which can be reached by pressing S in the editor or F4 from the title screen. Pressing F4 again allows a search string to be entered, this is case specific. F1 toggles between fuzzy and specific searching. Essentially, specific searching means that an exact match must be found for the string, and fuzzy searching means that the search is successful if the search string is found anywhere within the given field. F3 allows the search to be limited to just the title field (with T), just the personal memo lines (with M) or a specific memo line (with 1-10).

Option A will search the whole of each day entry. F2 swaps between view and edit modes. In view mode, each match found will be displayed, but it is not possible to perform editing. In edit mode, the first day matching the search criteria will be displayed ready for editing but it is not possible to find any further matches. The search itself is started by pressing F0. This can be very slow, so be patient and always remember that the ESCAPE key will take you back to the title screen.

The 'interesting' dates that *Hemera* knows about can be automatically inserted by pressing F2 when you are on the title page. This includes Easter (and all related movable feasts), saints' days and bank holidays. The religious dates are exact, but *Hemera*'s method of predicting bank holidays is not a dead cert, so don't go booking any days off work without consulting a real calendar first!

Hemera has a very versatile print menu accessed by pressing F6 on the title screen. You can print a day, a week or a month at a time either on a full page or onto a personal organiser sized sheet. Alternate pages will have the dates on opposite sides, so you can print on both sides of the paper. Printing organiser-sized pages can be awkward – special tractor feed paper is available, but it is quite expensive.

```
Hemera Desk Diary

Options Menu

Editing no file

f0 - Open Diary File
f1 - Scan/Edit Diary
f2 - Auto-Insert Calendrical Data
f3 - Go to Day
f4 - Interrogate Diary
f5 - Create New Diary File
f6 - Print Diary
f7 - Help Screen
f8 - Exit Program HEMERA

*  - Operating System Command

Please select the option you require

ESCAPE returns to Options Menu
```

Hemira: a menu-driven diary that's both easy to use and accurate

Blank organiser pages can be bought in stationers, but can be fiddly to feed through a printer. The simplest way is to print on full A4 sheets and then trim the paper down to 171×96mm. Holes can then be cut with a six-hole hole punch or with a single-hole one and using a 'real' organiser page as a guide.

Interested readers may like to take a look at some of the calendrical calculations performed by the program. FNleap returns TRUE for a leap year (divisible by four, unless it's divisible by 100 in which case it must be divisible by 400). FNday returns the day number within the year for a given date. FNweekday returns a number from zero (saturday) to six (friday) corresponding to the day of the week for a given date.

Finally, FNeaster uses FNgoldn, FNdominical and a large table, which was copied from *The Book of Common Prayer,* to calculate the day and month of Easter for a given year. Lines 4110-4151 contain a list of the 'special' days. If you want to expand on these, possibly adding in your own important dates, such as birthdays and anniversaries, then feel free to do so.



Program	Page	BBC B B+	B+/ 128	Master 128	Master Compact	Electron	6502SP/ Turbo	ADFS	Econet	Shadow Ram	Archimedes/ A3000/A5000	Monthly disc
Wired for Sound	58							*	*		*	*
*INFO	65											
Info1		*	*	*	*	*	*	*	*	*	*	*
Info 2-3								*	*		*	*
Info 4		*	*	*	*	*	*	*	*	*		*
Info 5-6								*	*		*	*
Info7		*	*	*	*		*	*	*	*		*
Info 8		*	*	*	*	*	*	*	*	*	*	*
Info9								*	*		*	*
Info 10		*	*	*	*	*	*	*	*	*	*	*
C Programming	73							*	*		*	*
Arc Assembly	76							*	*		*	*
Pieces of Eight	81	*	*	*	*		*	*	*	*		*

Typing in listings from the yellow pages.

The yellow pages are subdivided into article headings. Each article heading corresponds with its article in the magazine.

So for instance to find listing three of *INFO in the yellow pages (AccentSRC) look for the *INFO heading, then follow the listings through until you get to listing three.

At the beginning of the program are a few lines that tell you what machines it works on. This information can also be derived from the table above.

For Archimedes owners it may not be immediately obvious how to actually type in the listings. By pressing Function key 12 you can access the command line. From here type BASIC and the Archimedes will enter the Basic language. You may like to type MODE 12, which will turn the screen to white on black.

Then simply copy each line of the program in turn after the '>' prompt, pressing RETURN when finished. Save the program onto disc by typing SAVE"<filename>". It can then be run by typing RUN. You will probably need to debug it as you may have made some typing errors.

When you have finished debugging save the program one last time. Then it can either be double-clicked upon from the desktop, or loaded using LOAD"<filename>".

A more detailed description of how to type in listings from the yellow pages appears on page 63.

WIRED FOR SOUND

Listing 1 - SampleRate

```
   10 REM SampleRate (Sound1)
   20 REM by David Radford
   30 REM for Arc only
   40 REM (c) BAU August 1992
   50 :
   60 PROCassem
   70 :
   80 PRINT"Enter filename of sample:"
   90 INPUT ""f$
  100 SYS "OS_File",5,f$ TO a%,,,,l%
  110 IF a%<>1 THEN l%=10
  120 DIM buffer% l%
  130 SYS "OS_File",255,f$,buffer%,0
  140 :
  150 PRINT'"Press H for High, M for Medium or L for Low, or use"
  160 PRINT"cursor up/down keys to alter sample period manually."
  170 PRINT"Press RETURN to confirm setting."
  180 cr%=?buffer%
  190 PRINT'"Current sample period : ";FNperiod(cr%)
  200 sr%=cr%
  210 b$=STRING$(10,CHR$32)+STRING$(10,CHR$127)
  220 *FX 4 1
  230 REPEAT
  240 PRINTCHR$13;"New sample period : ";FNperiod(sr%);b$;
  250 G%=GET
  260 CASE G% OF
  270 WHEN 139:IF sr%<255 THEN sr%+=1
  280 WHEN 138:IF sr%>4 THEN sr%-=1
  290 WHEN ASC"H":sr%=24
  300 WHEN ASC"M":sr%=48
  310 WHEN ASC"L":sr%=96
  320 ENDCASE
  330 UNTIL G%=13
  340 PRINT
  350 *FX 4
  360 phaseacc%=sr%/cr%*(1<<24)
  370 :
  380 PRINT'"Enter filename to save under (or RETURN for same):"
  390 INPUT ""o$
  400 IF o$="" THEN o$=f$
  410 :
  420 file%=OPENOUT o$
  430 IF file%=0 THEN PRINT"Unable to open file":END
  440 ON ERROR ON ERROR OFF:REPORT:PRINT" at line ";ERL:CLOSE#file%:END
  450 SYS "OS_File",18,o$,&D3C
  460 BPUT #file%,sr%
  470 A%=buffer%+1
  480 B%=l%-1
  490 C%=file%
  500 D%=phaseacc%
  510 CALL alterpitch
  520 CLOSE #file%
  530 END
  540 :
  550 DEF FNperiod(a%)
  560 a$=STR$a%+"us"
  570 CASE a% OF
  580 WHEN 24:a$="24us (High)"
  590 WHEN 48:a$="48us (Medium)"
  600 WHEN 96:a$="96us (Low)"
  610 ENDCASE
  620 =a$
  630 :
  640 DEF PROCassem
  650 DIM code% 1024
  660 FOR PASS=0 TO 2 STEP 2
  670 P%=code%
  680 [OPT PASS
  690 :
  700 .outputbuffer
  710 ]:P%+=256:[OPT PASS
  720 :
  730 .alterpitch
  740 STMFD R13!,{R14}
  750 MOV R4,#0
  760 ADR R5,outputbuffer
  770 MOV R6,R5
  780 ADD R8,R6,#256
  790 ADD R1,R0,R1
  800 .pitchloop
  810 ADD R7,R0,R4,LSR #24
  820 CMP R7,R1
  830 BGE finish
  840 LDRB R7,[R0,R4,LSR #24]
  850 STRB R7,[R5],#1
  860 CMP R5,R8
  870 BLGE writebuffer
  880 ADDS R4,R4,R3
  890 ADDCS R0,R0,#256
  900 B pitchloop
  910 :
  920 .finish
  930 CMP R5,R6
  940 BLGT writebuffer
  950 LDMFD R13!,{PC}
  960 :
  970 .writebuffer
  980 STMFD R13!,{R0-R4,R14}
  990 MOV R0,#2
 1000 MOV R1,R2
 1010 MOV R2,R6
 1020 SUB R3,R5,R6
 1030 SWI "OS_GBPB"
 1040 MOV R5,R6
 1050 LDMFD R13!,{R0-R4,PC}
 1060 ]NEXT
 1070 ENDPROC
```

Listing 2 - ModuleGen

```
   10 REM ModuleGen (Sound2)
   20 REM by David Radford
   30 REM for Arc only
   40 REM (c) BAU August 1992
   50 :
   60 PROCload
   70 PROCcheckrate
   80 PROCassem
   90 PROCbuildtable
  100 PROCsave
  110 END
  120 :
  130 DEF PROCload
  140 PRINT "Enter filename of sample to use:"
  150 INPUT ""f$
  160 SYS "OS_File",5,f$ TO a%,,,,l%
  170 IF a%<>1 THEN l%=10
  180 IF l%<2 THEN l%=256
  190 k%=((l%-1+255) AND (NOT255))+1
  200 DIM sample% k%
  210 FOR T%=k%-256 TO k%-1:sample%?T%=0:NEXT
  220 SYS "OS_File",255,f$,sample%,0
  230 f$=FNstrip(f$,":")
  240 f$=FNstrip(f$,".")
  250 PROCinput(f$)
  260 INPUT "Name to give sample: "n$
  270 sp%=sample%+1
  280 sl%=(k%-1) DIV256
  290 ENDPROC
  300 :
  310 DEF FNstrip(a$,b$)
  320 WHILE INSTR(a$,b$)>1
  330 a$=MID$(a$,INSTR(a$,b$)+1)
  340 ENDWHILE
  350 =a$
  360 :
  370 DEF PROCinput(a$)
  380 *FX 15
  390 FOR T%=1 TO LENa$
  400 SYS "OS_Byte",138,0,ASC(MID$(a$,T%,1))
  410 NEXT
  420 ENDPROC
  430 :
  440 DEF PROCcheckrate
  450 correctpitch%=TRUE
  460 IF ?sample%>7 THEN ENDPROC
  470 o%=127+(?sample%-4)*32
  480 PRINT'"WARNING!"
  490 PRINT"This sample won't play correctly using *SPlay";n$
  500 PRINT"at sample periods greater than ";o%;"us."
  510 PRINT"I can lower the tuning that this module uses by three"
  520 PRINT"octaves to fix this."
  530 PRINT"Do you want me to do this ? (Y/N) ";
  540 REPEAT G$=GET$:UNTIL G$="Y" OR G$="N"
  550 IF G$="Y" THEN correctpitch%=FALSE
  560 PRINTG$:ENDPROC
  570 :
  580 DEF PROCassem
  590 DIM a%(4),b%(4)
  600 DIM code% &1000
  610 FOR PASS=0 TO 2 STEP 2
  620 P%=code%
  630 [OPT PASS
  640 :
  650 .module
  660 EQUD 0
  670 EQUD init-module
  680 EQUD finish-module
  690 EQUD 0
  700 EQUD title-module
  710 EQUD help-module
  720 EQUD command-module
  730 EQUD 0
  740 EQUD 0
  750 EQUD 0
  760 EQUD 0
  770 :
  780 .title
  790 EQUS n$:EQUB 0
  800 :
  810 .helptext
  820 EQUS "*SPlay"+n$+" plays back the sample '"+n$+"' on the specified channel at its natural speed. If no channel is given, channel 1 is used."
  830 EQUB 13:EQUB 13
  840 .syntax
  850 EQUS "Syntax: *SPlay"+n$+" [<channel>]"
  860 EQUB 0
  870 ALIGN
  880 :
  890 .help
  900 EQUS "Sound Module"
  910 EQUB 9:EQUS "1.01 (18 May 1992) by BAU"
  920 EQUB 0
  930 ALIGN
  940 :
  950 .command
  960 EQUS "SPlay"+n$
  970 EQUB 0:ALIGN
  980 EQUD playsample-module
  990 EQUD &00010000
 1000 EQUD syntax-module
 1010 EQUD helptext-module
 1020 EQUD 0
 1030 :
 1040 .init
 1050 STMFD R13!,{R14}
 1060 ADR R0,P%+12
 1070 STMFD R13!,{R0}
 1080 B Instantiate
 1090 ADR R0,voice
 1100 MOV R1,#0
 1110 SWI "XSound_InstallVoice"
 1120 LDMFD R13!,{R14}
 1130 STR R1,voicenumber
 1140 ADR R0,installerror
 1150 TEQ R1,#0
 1160 ORREQS PC,R14,#1<<28
 1170 BICNES PC,R14,#1<<28
 1180 :
 1190 .finish
 1200 STMFD R13!,{R14}
 1210 LDR R1,voicenumber
```




```
1220 SWI "XSound_RemoveVoice"
1230 LDMFD R13!,{R14}
1240 ADR RØ,removeerror
1250 TEQ R1,#Ø
1260 ORREQS PC,R14,#1<<28
1270 BICNES PC,R14,#1<<28
1280 :
1290 .voice
1300 B Fill
1310 B (-Update*correctpitch%-Fill*(NOT
correctpitch%))
1320 B GateOn
1330 B GateOff
1340 B Instantiate
1350 LDMFD R13!,{PC}
1360 LDMFD R13!,{PC}
1370 EQUD voicename-voice
1380 :
1390 .installerror
1400 EQUD 1
1410 EQUS "Unable to install voice gene
rator"
1420 EQUB Ø
1430 ALIGN
1440 .removeerror
1450 EQUD 1
1460 EQUS "Unable to remove voice gener
ator"
1470 EQUB Ø
1480 ALIGN
1490 .channelserror
1500 EQUD 1
1510 EQUS "Invalid channel number (1-8)
"
1520 EQUB Ø
1530 ALIGN
1540 :
1550 .voicenumber EQUD Ø
1560 :
1570 .playsample
1580 STMFD R13!,{R14}
1590 TEQ R1,#Ø
1600 MOVEQ R6,#1
1610 BEQ noparams
1620 MOV R1,RØ
1630 MOV R2,#8
1640 MOV RØ,#1Ø
1650 SWI "XOS_ReadUnsigned"
1660 BVS playerror
1670 ADR RØ,channelserror
1680 CMP R2,#1
1690 BLT playerror
1700 CMP R2,#8
1710 BGT playerror
1720 MOV R6,R2
1730 .noparams
1740 MOV RØ,R6
1750 LDR R1,voicenumber
1760 SWI "XSound_AttachVoice"
1770 BVS playerror
1780 MOV RØ,#Ø
1790 MOV R1,#Ø
1800 MOV R2,#Ø
1810 MOV R3,#Ø
1820 MOV R4,#Ø
1830 SWI "XSound_Configure"
1840 BVS playerror
1850 CMP R2,#255
1860 MOVGT R2,#255
1870 CMP R2,#4
1880 MOVLT R2,#4
1890 ADR RØ,pitchtable-4*4
1900 LDR R2,[RØ,R2,LSL #2]
1910 MOV RØ,R6
1920 MOV R1,#&1ØØ
1930 ORR R1,R1,#&7F
1940 MVN R3,#1<<31
1950 SWI "XSound_Control"
1960 LDMFD R13!,{R14}
1970 BICS PC,R14,#1<<28
1980 .playerror
1990 LDMFD R13!,{R14}
2000 ORRS PC,R14,#1<<28
2010 :
2020 .pitchtable
2030 ]:P%+=(255-4)*4+4:[OPT PASS
2040 :
2050 .Instantiate
2060 STMFD R13!,{RØ-R4}
2070 MOV RØ,#Ø
2080 MOV R1,#Ø
2090 MOV R2,#Ø
2100 MOV R3,#Ø
2110 MOV R4,#Ø
2120 SWI "XSound_Configure"
2130 LDRVC RØ,[R3,#8]
2140 STRVC RØ,logptr
2150 STRVS RØ,[R13]
2160 LDMFD R13!,{RØ-R4,PC}
2170 :
2180 .GateOff
2190 MOV RØ,#Ø
2200 .GateOffLoop
2210 STRB RØ,[R12],R11
2220 STRB RØ,[R12],R11
2230 STRB RØ,[R12],R11
2240 STRB RØ,[R12],R11
2250 CMP R12,R1Ø
2260 BLT GateOffLoop
2270 MOV RØ,#1
2280 LDMFD R13!,{PC}
2290 :
2300 .samplelen EQUD sl%
2310 .logptr EQUD Ø
2320 :
2330 .Update
2340 ]:IF correctpitch% THEN
2350 [OPT PASS
2360 LDR RØ,[R9,#4]
2370 MOV R1,RØ,LSR #16
2380 BIC RØ,RØ,R1,LSL #16
2390 MOV RØ,RØ,LSR #3
2400 ORR RØ,RØ,R1,LSL #16
2410 STR RØ,[R9,#4]
2420 B Fill
2430 ]
2440 ENDIF
2450 [OPT PASS
2460 .GateOn
2470 ADR RØ,sampledata
2480 ADR R1,samplelen
2490 LDMIA R1,{R1-R2}
2500 ADD R5,R9,#16
2510 STMIA R5,{RØ-R2}
2520 LDR RØ,[R9,#4]
2530 BIC RØ,RØ,#&FFØØØØØØ
2540 BIC RØ,RØ,#&FFØØØØ
2550 ]:IF correctpitch% THEN [OPT PASS:
MOV RØ,RØ,LSR #3:]
2560 [OPT PASS
2570 STR RØ,[R9,#4]
2580 .Fill
2590 LDMIA R9,{R1-R7}
2600 AND R1,R1,#127
2610 RSB R1,R1,#127
2620 .FillLoop
2630 ]:FOR T%=1 TO 4:[OPT PASS
2640 ADDS R2,R2,R2,LSL #16
2650 BCS b%(T%)
2660 .a%(T%)
2670 LDRB RØ,[R5,R2,LSR #24]
2680 LDRB RØ,[R7,RØ,LSL #5]
2690 SUBS RØ,RØ,R1
2700 MOVMI RØ,#Ø
2710 STRB RØ,[R12],R11
2720 ]:NEXT:[OPTPASS
2730 CMP R12,R1Ø
2740 BLT FillLoop
2750 SUBS R4,R4,#1
2760 STMIB R9,{R2-R6}
2770 MOVPL RØ,#8
2780 MOVMI RØ,#2
2790 LDMFD R13!,{PC}
2800 :
2810 ]:FOR T%=1 TO 4:[OPT PASS
2820 .b%(T%)
2830 ADD R5,R5,#256
2840 SUBS R6,R6,#1
2850 BGT a%(T%)
2860 MOV RØ,#Ø
2870 .blankloop
2880 STRB RØ,[R12],R11
2890 CMP R12,R1Ø
2900 BLT blankloop
2910 MOV RØ,#2
2920 LDMFD R13!,{PC}
2930 ]:NEXT:[OPT PASS
2940 :
2950 .voicename
2960 EQUS n$:EQUB Ø
2970 ALIGN
2980 .sampledata
2990 ]NEXT
3000 ENDPROC
3010 :
3020 DEF PROCbuildtable
3030 sr%=?sample%
3040 IF correctpitch% THEN b%=&1ØØ*8 EL
SE b%=&1ØØ
3050 FOR T%=4 TO 255
3060 a%=b%*T%/sr%
3070 pitchtable!((T%-4)*4)=(a% AND&FFFF
)+&1ØØØØ
3080 NEXT
3090 ENDPROC
3100 :
3110 DEF PROCsave
3120 PRINT '"Enter filename of module t
o produce:"
3130 INPUT ""o$
3140 X%=OPENOUT(o$)
3150 IF X%=Ø THEN PRINT"Unable to open
file":END
3160 SYS "OS_GBPB",2,X%,module,sampleda
ta-module
3170 SYS "OS_GBPB",2,X%,sp%,sl%*256
3180 CLOSE #X%
3190 SYS "OS_File",18,o$,&FFA
3200 ENDPROC
```

Listing 3 - SFXGen1

```
10 REM > SFXGen1 (sound3)
20 REM by David Radford
30 REM for Arc only
40 REM (c) BAU August 1992
50 :
60 swichunk%=&CD84Ø
70 numamp%=1Ø
80 numpitch%=1Ø
90 numwave%=1Ø
100 DIM code% &4ØØØ
110 FOR T%=Ø TO &3FFC STEP4
120 code%!T%=Ø:NEXT
130 FOR PASS=Ø TO 2 STEP 2
140 P%=code%
150 [OPT PASS
160 :
170 .module
180 EQUD Ø
190 EQUD init-module
200 EQUD finish-module
210 EQUD Ø
220 EQUD title-module
230 EQUD help-module
240 EQUD Ø
250 EQUD swichunk%
260 EQUD swi-module
270 EQUD switable-module
280 EQUD Ø
290 :
300 .title
310 FNs("SoundFX")
320 :
330 .help
340 EQUS "BAU Sound FX":EQUB 9
350 EQUS "1.Ø5 (Ø4 Apr 1992)"
360 EQUB Ø:ALIGN
370 :
380 .switable
390 EQUS "SoundFX":EQUB Ø
400 EQUS "Init":EQUB Ø
410 EQUS "GO":EQUB Ø
420 EQUS "Quit":EQUB Ø
430 EQUS "Env":EQUB Ø
440 EQUS "On":EQUB Ø
450 EQUS "Off":EQUB Ø
460 EQUB Ø
470 ALIGN
480 :
490 .swi
500 CMP R11,#6
510 ADDLT PC,PC,R11,LSL #2
520 B error1
530 B FXinit
540 B FXgo
550 B FXquit
560 B FXenv
570 B FXon
580 B FXoff
590 :
600 .error1
610 ADR RØ,errmess1
620 ORRS PC,R14,#1<<28
630 .error2 FNerror(errmess2)
640 .error3 FNerror(errmess3)
650 .error4 FNerror(errmess4)
660 .errorexit
670 MOV R11,RØ
680 LDMFD R13!,{RØ-R9}
690 MOV RØ,R11
700 ORRS PC,R14,#1<<28
710 :
720 .errmess1 FNe(&1E6,"Unknown SoundF
X operation")
730 .errmess2 FNe(Ø,"Bad sound effect
number")
740 .errmess3 FNe(Ø,"Undefined sound e
ffect requested")
750 .errmess4 FNe(Ø,"Too many sound ef
fects")
760 .errmess5 FNe(Ø,"Amplitude envelop
e number out of range (Ø-"+STR$(numamp%-
1)+")")
770 .errmess6 FNe(Ø,"Pitch envelope nu
mber out of range (Ø-"+STR$(numpitch%-1)
+")")
780 .errmess7 FNe(Ø,"Waveform number o
ut of range (Ø-"+STR$(numwave%-1)+")")
790 .errmess8 FNe(Ø,"Unknown envelope
type")
800 .errmess9 FNe(Ø,"Bad number of voi
ces (1-8)")
810 .errmess1Ø FNe(Ø,"Bad voice number
")
820 :
830 .error5 FNerror(errmess5)
840 .error6 FNerror(errmess6)
850 .error7 FNerror(errmess7)
860 .error8 FNerror(errmess8)
870 .error9 FNerror(errmess9)
880 .error1Ø FNerror(errmess1Ø)
890 :
900 .chantab EQUD &Ø4Ø4Ø2Ø1
910 EQUD &Ø8Ø8Ø8Ø8
920 .chans EQUD Ø
930 .initflag EQUD Ø
940 .totaleff EQUD Ø
950 .effptr EQUD effectstore-effptr
960 :
970 .FXinit
980 STMFD R13!,{RØ-R9}
990 CMP RØ,#1
1000 BLT okexit
1010 CMP RØ,#32
1020 BGT error4
1030 CMP R2,#1
1040 BLT error9
1050 CMP R2,#8
1060 BGT error9
1070 STR RØ,totaleff
1080 ADR R9,effptr
1090 LDR R8,[R9]
1100 ADD R9,R9,R8
1110 ADR R3,maxtab
1120 .copyefftab
1130 FNload(4,1)
1140 LDR R8,[R3,#8]
1150 CMP R4,R8
1160 BGE error7
1170 LDR R8,[R3,#4]
1180 CMP R5,R8
1190 BGE error6
1200 LDR R8,[R3]
1210 CMP R6,R8
1220 BGE error5
1230 AND R7,R7,#127
1240 FNsave(4,9)
1250 FNload(4,1)
1260 CMP R4,R2
1270 BGT error1Ø
1280 CMN R5,#128
1290 ADDEQ R5,R5,#1
1300 FNsave(4,9)
1310 FNload(4,1)
1320 ORR R4,R4,R5,LSL #8
1330 ORR R4,R4,R6,LSL #16
1340 ORR R4,R4,R7,LSL #24
1350 STR R4,[R9],#4
1360 SUBS RØ,RØ,#1
1370 BNE copyefftab
1380 SUB R2,R2,#1
1390 ADR R3,chantab
1400 LDRB RØ,[R3,R2]
1410 STR RØ,chans
1420 MOV RØ,#1
1430 MOV R1,#2Ø8
1440 MOV R2,#48
1450 MOV R3,#Ø
1460 MOV R4,#Ø
1470 STMFD R13!,{R14}
1480 SWI "XSound_Configure"
1490 LDMFD R13!,{R14}
1500 BVS errorexit
1510 LDR RØ,chans
1520 MOV R1,#Ø
1530 MOV R2,#Ø
1540 MOV R3,#Ø
1550 MOV R4,#Ø
1560 STMFD R13!,{R14}
1570 SWI "XSound_Configure"
1580 LDMFD R13!,{R14}
1590 BVS errorexit
1600 LDR R3,initflag
1610 MOV R4,#255
1620 STR R4,initflag
1630 CMP R3,#Ø
1640 ADR R4,configtab
1650 BNE okexit
1660 STMIA R4,{RØ-R2}
1670 MOV RØ,#1
1680 LDR R5,voiceslot
1690 ADR R6,oldslots
1700 .chanloop1
1710 MOV R1,R5
1720 STMFD R13!,{R14}
1730 SWI "XSound_AttachVoice"
1740 LDMFD R13!,{R14}
1750 STRB R1,[R6],#1
1760 CMP RØ,#Ø
1770 BEQ okexit
1780 ADD RØ,RØ,#1
1790 CMP RØ,#9
1800 BNE chanloop1
1810 B okexit
1820 :
1830 .oldslots FNr(8)
1840 :
1850 .FXquit
1860 STMFD R13!,{RØ-R9}
1870 LDR R3,initflag
1880 CMP R3,#Ø
1890 BEQ okexit
1900 ADR R4,configtab
1910 LDMIA R4,{RØ-R2}
1920 MOV R3,#Ø
1930 MOV R4,#Ø
1940 STMFD R13!,{RØ,R14}
1950 MOV RØ,#1
1960 SWI "XSound_Configure"
1970 LDMVSFD R13!,{R1,R14}
1980 BVS errorexit
1990 LDMFD R13!,{RØ}
2000 MOV R1,#Ø
2010 MOV R2,#Ø
2020 MOV R3,#Ø
2030 MOV R4,#Ø
2040 SWI "XSound_Configure"
2050 LDMFD R13!,{R14}
2060 BVS errorexit
2070 MOV R3,#Ø
2080 STR R3,initflag
2090 ADR R6,oldslots
2100 MOV RØ,#1
2110 .chanloop2
2120 LDRB R1,[R6],#1
2130 STMFD R13!,{R14}
2140 SWI "XSound_AttachVoice"
2150 LDMFD R13!,{R14}
2160 CMP RØ,#Ø
2170 BEQ okexit
2180 ADD RØ,RØ,#1
2190 CMP RØ,#9
2200 BNE chanloop2
2210 .okexit
2220 LDMFD R13!,{RØ-R9}
2230 MOVS PC,R14
2240 :
2250 .configtab
2260 EQUD Ø:EQUD Ø:EQUD Ø
2270 .amplogtable FNr(132)
2280 :
2290 .FXenv
2300 STMFD R13!,{RØ-R9}
2310 CMP RØ,#1
2320 CMPNE RØ,#2
2330 MOVEQ R2,#256
2340 CMP R2,#Ø
2350 BLE okexit
2360 CMP R2,#256
2370 MOVGT R2,#256
2380 CMP RØ,#Ø
2390 BLT error8
2400 CMP RØ,#2
2410 BGT error8
2420 MOV R4,RØ,LSL #2
2430 ADR R5,maxtab
2440 LDR R5,[R5,R4]
2450 ADR R6,error5
2460 CMP R3,#Ø
2470 ADDLT PC,R6,R4
2480 CMP R3,R5
2490 ADDGE PC,R6,R4
2500 ADR R5,dataoffsets
```

```
2510 LDR R6,[R5,R4]
2520 ADD R6,R6,R5
2530 ADD R6,R6,R3,LSL #8
2540 ADR R4,envlens
2550 CMP R0,#0
2560 STREQ R2,[R4,R3,LSL #2]
2570 MOV R3,R2
2580 .copyenv1
2590 LDRB R0,[R1],#1
2600 STRB R0,[R6],#1
2610 SUBS R3,R3,#1
2620 BNE copyenv1
2630 RSBS R2,R2,#256
2640 BEQ okexit
2650 MOV R0,#0
2660 .copyenv2
2670 STRB R0,[R6],#1
2680 SUBS R2,R2,#1
2690 BNE copyenv2
2700 B okexit
2710 :
2720 .maxtab
2730 EQUD numamp%
2740 EQUD numpitch%
2750 EQUD numwave%
2760 :
2770 .init
2780 STMFD R13!,{R14}
2790 ADR R0,amplogtable
2800 STR R0,amplog
2810 ADR R0,voice
2820 MOV R1,#0
2830 SWI "XSound_InstallVoice"
2840 LDMFD R13!,{R14}
2850 CMP R1,#0
2860 ORREQ PC,R14,#1<<28
2870 STR R1,voiceslot
2880 ADR R0,dataoffsets
2890 LDMIA R0,{R1-R3}
2900 ADD R1,R1,R0
2910 ADD R2,R2,R0
2920 ADD R3,R3,R0
2930 MOV R0,#256
2940 ADR R4,newdatatab
2950 ]
2960 FOR T%=1 TO 8
2970 [OPT PASS
2980 STMIA R4!,{R0-R3}
2990 ]NEXT
3000 [OPTPASS
3010 MOV PC,R14
3020 :
3030 .voiceslot EQUD 0
3040 :
3050 .finish
3060 STMFD R13!,{R14}
3070 LDR R1,voiceslot
3080 SWI "XSound_RemoveVoice"
3090 BLVC FXquit
3100 LDMFD R13!,{R14}
3110 MOV PC,R14
3120 :
3130 .dataoffsets
3140 EQUD amptab-dataoffsets
3150 EQUD pitchtab-dataoffsets
3160 EQUD wavetab-dataoffsets
3170 :
3180 .voice
3190 B fill
3200 B fill
3210 B gateon
3220 B gateoff
3230 B instantiate
3240 LDMFD R13!,{PC}
3250 LDMFD R13!,{PC}
3260 EQUD voicename-voice
3270 .voicename
3280 FNs("SoundFX")
3290 :
3300 .instantiate
3310 STMFD R13!,{R0-R4}
3320 MOV R0,#0
3330 MOV R1,#0
3340 MOV R2,#0
3350 MOV R3,#0
3360 MOV R4,#0
3370 SWI "XSound_Configure"
3380 LDRVC R1,[R3,#8]
3390 STRVC R1,linlog
3400 STRVS R0,[R13]
3410 LDMFD R13!,{R0-R4,PC}
3420 :
3430 .amplog EQUD 0
3440 .linlog EQUD 0
3450 .seed EQUD &8B99909E
3460 .mask EQUD &1D872B41
3470 .noisefill
3480 ADR R6,noiseptr
3490 LDR R8,[R6]
3500 ADD R6,R6,R8
3510 LDR R7,seed
3520 LDR R8,mask
3530 MOVS R7,R7,LSL #1
3540 EORCS R7,R7,R8
3550 ADDCS R6,R6,#256
3560 MOVS R7,R7,LSL #1
3570 EORCS R7,R7,R8
3580 ADDCS R6,R6,#512
3590 STR R7,seed
3600 B dofill
3610 :
3620 .gateon
3630 ADR R2,noiseflags
3640 LDRB R2,[R2,R7]
3650 STR R2,[R9,#64]
3660 ADR R2,newdatatab
3670 ADD R2,R2,R7,LSL #4
3680 ADD R8,R9,#12
3690 LDMIA R2,{R2-R5}
3700 ADR R6,amplog
3710 LDMIA R6,{R6-R7}
3720 STMIA R8,{R2-R7}
3730 :
3740 .fill
3750 LDMIA R9,{R0-R7}
3760 AND R0,R0,#127
3770 LDRB R8,[R4],#1
3780 LDRB R8,[R7,R8]
3790 SUBS R0,R0,R8
3800 MOVMI R0,#0
3810 RSB R0,R0,#127
3820 LDR R8,[R9,#64]
3830 TEQ R8,#0
3840 BNE noisefill
3850 ADR R7,pitchconvtab
3860 LDRB R8,[R5],#1
3870 LDR R8,[R7,R8,LSL #2]
3880 BIC R7,R1,#&FF<<24
3890 BIC R7,R7,#&FF<<16
3900 BIC R1,R1,#&FF<<8
3910 BIC R1,R1,#&FF
3920 MUL R7,R8,R7
3930 ORR R1,R1,R7,LSR #12
3940 .dofill
3950 LDR R7,[R9,#32]
3960 .fillloop
3970 ]
3980 FOR T%=1 TO 4
3990 [OPT PASS
4000 ADD R1,R1,R1,LSL #16
4010 LDRB R8,[R6,R1,LSR #24]
4020 LDRB R8,[R7,R8,LSL #5]
4030 SUBS R8,R8,R0,LSL #1
4040 MOVMI R8,#0
4050 STRB R8,[R12],R11
4060 ]NEXT
4070 [OPT PASS
4080 CMP R12,R10
4090 BLT fillloop
4100 SUBS R3,R3,#1
4110 STMIB R9,{R1-R5}
4120 MOVGT R0,#8
4130 MOVLE R0,#2
4140 LDMFD R13!,{PC}
4150 :
4160 .noiseptr EQUD noisetab-noiseptr
4170 .newdatatab
4180 ]
4190 FOR T%=1 TO 8
4200 [OPT PASS
4210 EQUD 100
4220 EQUD amptab-module
4230 EQUD pitchtab-module
4240 EQUD wavetab-module
4250 ]NEXT
4260 [OPT PASS
4270 :
4280 .gateoff
4290 MOV R0,#0
4300 .gateoffloop
4310 STRB R0,[R12],R11
4320 STRB R0,[R12],R11
4330 STRB R0,[R12],R11
4340 STRB R0,[R12],R11
4350 CMP R12,R10
4360 BLT gateoffloop
4370 MOV R0,#1
4380 LDMFD R13!,{PC}
4390 :
4400 .envlens FNr(numamp%*4)
4410 .noiseflags EQUD 0:EQUD 0
4420 :
4430 .FXgo
4440 STMFD R13!,{R0-R9}
4450 LDR R9,enableflag
4460 TEQ R9,#0
4470 BEQ exitgo
4480 CMP R0,#0
4490 BLT error2
4500 LDR R1,totaleff
4510 CMP R0,R1
4520 BGE error3
4530 ADR R9,effectstore
4540 ADD R9,R9,R0,LSL #2
4550 ADD R9,R9,R0,LSL #3
4560 LDRB R0,[R9,#4]
4570 ADR R2,noiseflags-1
4580 LDRB R3,[R9,#6]
4590 STRB R3,[R2,R0]
4600 ADR R5,envlens
4610 LDRB R4,[R9,#2]
4620 LDR R4,[R5,R4,LSL #2]
4630 ADR R11,newdatatab
4640 ADD R11,R11,R0,LSL #4
4650 SUB R11,R11,#16
4660 LDRB R5,[R9,#2]
4670 LDRB R6,[R9,#1]
4680 LDRB R7,[R9,#0]
4690 ADR R8,dataoffsets
4700 LDMIA R8,{R1-R3}
4710 ADD R1,R8,R1
4720 ADD R2,R8,R2
4730 ADD R3,R8,R3
4740 ADD R5,R1,R5,LSL #8
4750 ADD R6,R2,R6,LSL #8
4760 ADD R7,R3,R7,LSL #8
4770 STMIA R11,{R4-R7}
4780 LDRB R1,[R9,#3]
4790 ORR R1,R1,#&100
4800 LDR R2,[R9,#8]
4810 MOV R3,#255
4820 STMFD R13!,{R14}
4830 SWI "XSound_Control"
4840 LDRB R1,[R9,#5]
4850 MOV R1,R1,LSL #24
4860 MOV R1,R1,ASR #24
4870 SWIVC "XSound_Stereo"
4880 LDMFD R13!,{R14}
4890 BVS errorexit
4900 .exitgo
4910 LDMFD R13!,{R0-R9}
4920 MOVS PC,R14
4930 :
4940 .enableflag EQUD 255
4950 :
4960 .FXon
4970 STMFD R13!,{R0}
4980 MOV R0,#255
4990 STR R0,enableflag
5000 LDMFD R13!,{R0}
5010 MOVS PC,R14
5020 :
5030 .FXoff
5040 STMFD R13!,{R0}
5050 MOV R0,#0
5060 STR R0,enableflag
5070 LDMFD R13!,{R0}
5080 MOVS PC,R14
5090 :
5100 .effectstore
5110 ]
5120 FOR T%=1 TO 32
5130 [OPT PASS
5140 EQUD &7F000000
5150 EQUD &0001
5160 EQUD &4000
5170 ]NEXT
5180 [OPT PASS
5190 :
5200 .pitchconvtab FNr(4*256)
5210 .noisetab FNr(4*256*4)
5220 .amptab FNr(256*numamp%)
5230 .pitchtab FNr(256*numpitch%)
5240 .wavetab FNr(256*numwave%)
5250 ]NEXT
5260 PRINT"Building tables..."
5270 *Volume 127
5280 *Tuning 0
5290 FOR T%=0 TO 128
5300 SYS "Sound_SoundLog",(T%/128*127)<
<24 TO A%
5310 amplogtable?T%=127-(A% DIV2)
5320 NEXT
5330 T%=RND(-11)
5340 SYS "Sound_Pitch" TO a%
5350 SYS "Sound_Pitch",&2000 TO b%
5360 f=(b%-a%)/((2<<12)-(1<<11))
5370 FOR I%=0 TO 255
5380 L%=I% AND 127:IF I%>127 THEN L%=-L
%
5390 SYS "Sound_Pitch",(L%<<5)+&1000 TO
 c%
5400 pitchconvtab!(I%*4)=(c%-a%)/f+(1<<
11)
5410 NEXT
5420 FOR T%=0 TO 1023:noisetab?T%=RND(2
56):NEXT
5430 FOR T%=0 TO 255
5440 FOR I%=1 TO numwave%
5450 wavetab?(I%*256-256+T%)=FNwave(I%,
T%)
5460 NEXT
5470 FOR I%=1 TO numpitch%
5480 pitchtab?(I%*256-256+T%)=FNpitch(I
%,T%)
5490 NEXT
5500 FOR I%=1 TO numamp%
5510 amptab?(I%*256-256+T%)=FNamp(I%,T%
)
5520 NEXT
5530 NEXT
5540 SYS "OS_CRC",0,code%,P%,1 TO crc%
5550 IF crc%<>&F338 PRINT"Checksum fail
ed - check the listing for mistakes":END
5560 SYS "OS_Module",11,code%,P%-code%
5570 SYS "OS_File",10,"SoundFX",&FFA,,c
ode%,P%
5580 DIM soundblock% 384
5590 PROCinitsound(soundblock%)
5600 SYS"SoundFX_GO",0
5610 END
5620 :
5630 DEF PROCinitsound(p%)
5640 RESTORE +0:o%=p%
5650 READ q%,c%
5660 FOR t%=1 TO q%
5670 READ ?o%,o%?1,o%?2,o%?3,o%?4,o%?5,
o%?6,o%!8
5680 o%+=12
5690 NEXT
5700 SYS "SoundFX_Init",q%,p%,c%
5710 DATA 2,1
5720 DATA 3,4,5,127,1,0,0,&4000
5730 DATA 3,0,0,127,1,0,&FF,&4000
5740 ENDPROC
5750 :
5760 DEF FNe(e%,a$)
5770 [OPT PASS
5780 EQUD e%:FNs(a$):]:=""
5790 :
5800 DEF FNs(a$)
5810 [OPT PASS
5820 EQUS a$:EQUB 0:ALIGN:]:=""
5830 :
5840 DEF FNerror(a%)
5850 [OPT PASS
5860 ADR R0,a%:B errorexit:]:=""
5870 :
5880 DEF FNload(base%,src%)
5890 FOR T%=base% TO base%+3
5900 [OPT PASS
5910 LDRB T%,[src%],#1:]:NEXT:=""
5920 :
5930 DEF FNsave(base%,src%)
5940 FOR T%=base% TO base%+3
5950 [OPT PASS
5960 STRB T%,[src%],#1:]:NEXT:=""
5970 :
5980 DEF FNr(u%):P%+=u%:=""
5990 :
6000 DEF FNwave(w%,p%)
6010 IF w%=1 THEN =127*SIN(RAD(360/256*
p%))
6020 IF w%=2 THEN =80*SIN(RAD(360/256*p
%))+63*SIN(RAD(360/256*p%*8))
6030 IF w%=3 THEN =127*SGN(128-p%)
6040 IF w%=4 THEN =p%
6050 IF w%=5 THEN =(((p%<<24)/2) >>> 24
)+63*SIN(RAD(360/256*p%*3))
6060 =0
6070 :
6080 DEF FNpitch(w%,p%)
6090 IF w%=1 THEN =0
6100 IF w%=2 THEN =128+5
6110 IF w%=3 THEN =FNsign(COS(RAD(p%/64
*360))*5)
6120 IF w%=4 THEN =128+10
6130 IF w%=5 THEN =RND(127)
6140 =0
6150 :
6160 DEF FNsign(a%):IF a%<0 THEN =-a%+1
28 ELSE =a%
6170 :
6180 DEF FNamp(w%,p%)
6190 ON w% PROCcalc(0,255),PROCcalc(0,1
45),PROCcalc(4,24),PROCcalc(0,32),PROCca
lc(0,64),PROCcalc(4,100),PROCcalc(0,255)
,PROCcalc(0,255),PROCcalc(0,255),PROCcal
c(0,255)
6200 =v%
6210 :
6220 DEF PROCcalc(s%,e%)
6230 e%=e%*0.7
6240 envlens!(w%*4-4)=s%+e%
6250 IF p%<s% THEN v%=127/s%*p%
6260 IF p%=s% THEN v%=127
6270 IF p%>s% THEN v%=127-127/e%*(p%-s%
)
6280 IF p%=255 THEN v%=0
6290 IF p%>e%+s% THEN v%=0
6300 ENDPROC
```

***INFO**

Listing 1 - IFS8

```
10 REM >IFS8 (Info1)
20 REM by Gareth Eley
30 REM for all machines
40 REM (c) BAU August 1992
50 :
60 arc=(HIMEM>&10000)
70 ON ERROR GOTO 160
80 MODE 0
90 PROCsetupvars
100 REPEAT
110 PROCRenderIFS
120 PROCzoom
130 UNTIL FALSE
140 END
150 :
160 IF ERR=17 AND INKEY-2 THEN MODE0:E
ND
170 IF ERR=17 THEN RUN
180 REPORT:PRINT ERL
190 END
200 :
210 DEF PROCsetupvars
220 VDU 23;10,95;0;0;0;
230 scale%=1000
240 VDU 29,140;12;
250 VDU 24,0;0;scale%-1;scale%-1;
260 max%=1E6
270 PROCtransformations
280 ENDPROC
290 :
300 DEF PROCRenderIFS
310 CLS
320 GCOL 0,1
330 PROCinitial
340 s=RND(-TIME)
350 xscale=scale%/(xmax-xmin)
360 yscale=scale%/(ymax-ymin)
370 N%=0
380 REPEAT
390 r=RND(1)
400 sum=0
410 K%=0
420 REPEAT
430 K%=K%+1
440 sum=sum+P(K%)
450 UNTIL sum>r
460 PROCtransform
470 P%=(x-xmin)*xscale:Q%=(y-ymin)*ysc
ale
480 IF P%>0 AND P%<scale% AND Q%>0 AND
 Q%<scale% THEN PLOT 69,P%,Q%:N%=N%+1
490 UNTIL N%>max% OR INKEY-17
500 ENDPROC
510 :
520 DEF PROCtransform
530 x1=a(K%,1)*x+a(K%,2)*y+b(K%,1)
540 y1=a(K%,3)*x+a(K%,4)*y+b(K%,2)
```

```
550 x=x1:y=y1
560 ENDPROC
570 :
580 DEF PROCinitial
590 a11=a(1,1):a12=a(1,2):a21=a(1,3):a22=a(1,4)
600 b1=b(1,1):b2=b(1,2)
610 A=(1-a11)
620 B=(a12*b2)/(1-a22)
630 C=(a21*a12)/(1-a22)
640 REM calc initial x & y coords
650 x=(b1+B)/(A-C)
660 y=(b2+a21*x)/(1-a22)
670 ENDPROC
680 :
690 DEF PROCzoom
700 X%=400:Y%=400
710 size%=200
720 IF arc THEN PROCmouse
730 GCOL 3,1
740 PROCrec(X%,Y%,size%)
750 REPEAT
760 *FX 19
770 PROCrec(X%,Y%,size%)
780 PROCgetpos
790 IF Z%=1 AND size%>100 size%=size%-4
800 IF Z%=4 AND size%<scale% size%=size%+4
810 PROCrec(X%,Y%,size%)
820 UNTIL Z%=2
830 xmin=xmin+X%/xscale:xmax=xmin+size%/xscale
840 ymin=ymin+Y%/yscale:ymax=ymin+size%/yscale
850 ENDPROC
860 :
870 DEF PROCmouse
880 MOUSE RECTANGLE 0,0,1140,1012
890 MOUSE TO X%,Y%
900 ENDPROC
910 :
920 DEF PROCrec(a,b,c)
930 MOVE a,b:DRAW a+c,b:DRAW a+c,b+c
940 DRAW a,b+c:DRAW a,b
950 ENDPROC
960 :
970 DEF PROCgetpos
980 IF arc THEN MOUSE X%,Y%,Z%:ENDPROC
990 Z%=0
1000 IF INKEY-1 THEN step%=32 ELSE step%=4
1010 IF INKEY-26 AND X%>0 X%=X%-step%
1020 IF INKEY-122 AND X%<scale% X%=X%+step%
1030 IF INKEY-42 AND Y%>0 Y%=Y%-step%
1040 IF INKEY-58 AND Y%<scale% Y%=Y%+step%
1050 Z%=Z%-(INKEY-103)-2*(INKEY-99)-4*(INKEY-104)
1060 ENDPROC
1070 :
1080 DEF PROCtransformations
1090 PRINT "Current codes :"'
1100 RESTORE 1540
1110 READ number
1120 FOR T%=1 TO number
1130 READ name$
1140 PRINT T%;". ";name$
1150 NEXT
1160 RESTORE 1600
1170 PRINT '"Which image (1-";number;")?"
1180 A%=GET-48:IF A%<1 OR A%>number THEN 1170
1190 FOR T%=1 TO A%
1200  READ line%
1210 NEXT
1220 PROCgetdata
1230 ENDPROC
1240 :
1250 DEF PROCgetdata
1260 RESTORE line%
1270 READ num
1280 DIM a(num,4),b(num,2),P(num)
1290 READ trans
1300 IF trans=1 THEN PROCtrans2 ELSE PROCtrans1
1310 FOR T%=1 TO num
1320  READ P(T%)
1330 NEXT
1340 READ xmin,ymin,xmax,ymax
1350 ENDPROC
1360 :
1370 DEF PROCtrans1
1380 FOR T%=1 TO num
1390 FOR S%=1 TO 4
1400 READ a(T%,S%)
1410 NEXT
1420 READ b(T%,1),b(T%,2)
1430 NEXT
1440 ENDPROC
1450 :
1460 DEF PROCtrans2
1470 FOR T%=1 TO num
1480 READ r,s,theta,phi,b(T%,1),b(T%,2)
1490 a(T%,1)=r*COSRAD(theta):a(T%,2)=-s*SINRAD(phi)
1500 a(T%,3)=r*SINRAD(theta):a(T%,4)=s*COSRAD(phi)
1510 NEXT
1520 ENDPROC
1530 :
1540 DATA 9
1550 DATA "fern leaf","Sierpinski triangle"
1560 DATA "Sierpinski carpet","leaf","Koch curve","Bush"
1570 DATA "Pythagorus triangle","Snowflake"
1580 DATA "Tree"
1590 :
1600 DATA 1640,1740,1830,1970,2070
1610 DATA 2170,2270,2350,2490
1620 :
1630 REM data for fern
1640 DATA  4
1650 DATA  1
1660 DATA  0.0,   0.16,    0,    0, 0,   0
1670 DATA  0.85,  0.85, -2.5, -2.5, 0,  1.6
1680 DATA  0.3,   0.3,    49,   49, 0,  1.6
1690 DATA  0.3,   0.37,  120,  -50, 0,  0.44
1700 DATA  0.02, 0.7, 0.14, 0.14
1710 DATA -5,0,5,11
1720 :
1730 REM data for Sierpinski Gasket
1740 DATA 3
1750 DATA 0
1760 DATA 0.5, 0, 0, 0.5, 0.25, 0
1770 DATA 0.5, 0, 0, 0.5, 0, 0.5
1780 DATA 0.5, 0, 0, 0.5, 0.5, 0.5
1790 DATA 0.3334,0.3333,0.3333
1800 DATA 0,0,1,1
1810 :
1820 REM data for Sierpinski carpet
1830 DATA 8
1840 DATA 0
1850 DATA 0.3333, 0, 0, 0.3333,      0,      0
1860 DATA 0.3333, 0, 0, 0.3333, 0.3333,      0
1870 DATA 0.3333, 0, 0, 0.3333, 0.6666,      0
1880 DATA 0.3333, 0, 0, 0.3333,      0, 0.3333
1890 DATA 0.3333, 0, 0, 0.3333, 0.6666, 0.3333
1900 DATA 0.3333, 0, 0, 0.3333,      0, 0.6666
1910 DATA 0.3333, 0, 0, 0.3333, 0.3333, 0.6666
1920 DATA 0.3333, 0, 0, 0.3333, 0.6666, 0.6666
1930 DATA 0.125 ,0.125, 0.125, 0.125, 0.125, 0.125, 0.125, 0.125
1940 DATA 0,0,1,1
1950 :
1960 REM data for leaf
1970 DATA 4
1980 DATA 0
1990 DATA 0.6,    0,    0, 0.6,  0.18, 0.36
2000 DATA 0.6,    0,    0, 0.6,  0.18, 0.12
2010 DATA 0.4,  0.3, -0.3, 0.4,  0.27, 0.36
2020 DATA 0.4, -0.3,  0.3, 0.4,  0.27, 0.09
2030 DATA 0.25, 0.25, 0.25, 0.25
2040 DATA 0,0,1,1
2050 :
2060 REM data for Koch curve
2070 DATA 4
2080 DATA 1
2090 DATA 0.333, 0.333,   0,   0,     0,     0
2100 DATA 0.333, 0.333, -60, -60,   0.5, 0.2887
2110 DATA 0.333, 0.333,  60,  60, 0.333,     0
2120 DATA 0.333, 0.333,   0,   0, 0.666,     0
2130 DATA 0.25, 0.25, 0.25, 0.25
2140 DATA 0,-0.5,1,0.5
2150 :
2160 REM data for bush (tree)
2170 DATA 4
2180 DATA 1
2190 DATA 0, 0.53 , 0, 0, 0, 0
2200 DATA 0.5, 0.5,  30,  30, 0, 0.5
2210 DATA 0.5, 0.5, -30, -30, 0, 0.5
2220 DATA 0.5, 0.5,   0,   0, 0,   0
2230 DATA 0.25, 0.25, 0.25, 0.25
2240 DATA -0.5,0,0.5,1
2250 :
2260 REM data for Pythagorus triangle
2270 DATA 2
2280 DATA 1
2290 DATA 0.707, 0.707,  45,  45,  0.25, 1.25
2300 DATA 0.707, 0.707, -45, -45, -0.25, 1.25
2310 DATA 0.5,0.5
2320 DATA -2,0,2,4
2330 :
2340 REM Snowflake
2350 DATA 7
2360 DATA 1
2370 DATA 0.333, 0.333, 0, 0, 0.333, 0.666
2380 DATA 0.333, 0.333, 0, 0,     0, 0.5
2390 DATA 0.333, 0.333, 0, 0, 0.666, 0.5
2400 DATA 0.333, 0.333, 0, 0,     0, 0.166
2410 DATA 0.333, 0.333, 0, 0, 0.666, 0.166
2420 DATA 0.333, 0.333, 0, 0, 0.333, 0
2430 DATA 0.333, 0.333, 0, 0, 0.333, 0.333
2440 DATA 0.143, 0.143, 0.143, 0.143
2450 DATA 0.143, 0.143, 0.143
2460 DATA -0.25,-0.25,1.25,1.25
2470 :
2480 REM Tree
2490 DATA 4
2500 DATA 1
2510 DATA 0.6, 0.6, 30, 30, 0, 0.4
2520 DATA 0.6, 0.6, -30, -30,  0, 0.4
2530 DATA 0.5, 0.5, -15,-15, 0, 0.4
2540 DATA   0, 0.42,    0,  0,  0,  0
2550 DATA 0.3, 0.3, 0.2, 0.2
2560 DATA -0.5,0,0.5,1
```

Listing 2 - IFS32

```
10 REM >IFS32 (Info2)
20 REM by Gareth Eley
30 REM for 32-bit machines
40 REM (c) BAU August 1992
50 :
60 ON ERROR GOTO 150
70 MODE 0
80 PROCsetupvars
90 REPEAT
100 PROCRenderIFS
110 PROCzoom
120 UNTIL FALSE
130 END
140 :
150 IF ERR=17 AND INKEY-2 THEN MODE0:END
160 IF ERR=17 THEN RUN
170 REPORT:PRINT ERL
180 END
190 :
200 DEF PROCsetupvars
210 DIM prob% 3000,code% 3000,trans% 3000
220 OFF
230 sc=24
240 scale=2^sc
250 pixels%=1000
260 ORIGIN 140,12
270 VDU 24,0;0;pixels%-1;pixels%-1;
280 max%=1E7
290 PROCsetupmc
300 PROCtransformations
310 ENDPROC
320 :
330 DEF PROCRenderIFS
340 CLS
350 GCOL 0,1
360 xscale=pixels%/(xmax-xmin)
370 yscale=pixels%/(ymax-ymin)
380 !xmult=xscale
390 !ymult=yscale
400 !xminus=xmin*scale:!yminus=ymin*scale
410 !count=max%
420 A%=x*scale:B%=y*scale
430 CALL ifs
440 ENDPROC
450 :
460 DEF PROCsetupmc
470 FOR pass=0 TO 2 STEP 2
480 P%=code%
490 x=0:y=1
500 [OPT pass
510 .ifs
520 STMFD R13!,{R14}
530 .mainloop
540 BL random
550 BL trans
560 BL plot
570 BL keypress
580 LDMEQFD R13!,{R15}
590 LDR R12,count
600 SUBS R12,R12,#1
610 STR R12,count
620 LDMEQFD R13!,{R15}
630 B mainloop
640
650 .count EQUD 0
660
670 .random
680 STMFD R13!,{R14}
690 LDR R11,seed
700 LDR R12,xor
710 FNrand(sc)
720 STR R11,seed
730 MOV R9,R11,LSR #(32-sc)
740 LDR R8,probloc
750 MOV R3,#0
760 LDR R10,[R8,#0]
770 .randomloop
780 CMP R10,R9
790 LDMPLFD R13!,{R15}
800 ADD R3,R3,#1
810 LDR R12,[R8,R3,LSL #2]
820 ADD R10,R10,R12
830 B randomloop
840
850 .seed EQUD TIME
860 .xor EQUD &1D872B41
870
880 .trans
890 STMFD R13!,{R14}
900 LDR R2,transdata
910 MOV R4,R3,LSL #4
920 ADD R3,R4,R3,LSL #3
930 ADD R2,R2,R3
940 LDMIA R2!,{R3-R5}
950 FNmult(x,3,6)
960 FNmult(y,4,7)
970 ADD R6,R6,R7
980 ADD R14,R6,R5
990 LDMIA R2!,{R3-R5}
1000 FNmult(x,3,6)
1010 FNmult(y,4,7)
1020 ADD R6,R6,R7
1030 ADD y,R6,R5
1040 MOV x,R14
1050 LDMFD R13!,{R15}
1060
1070 .probloc EQUD prob%
1080 .transdata EQUD trans%
1090
1100 .plot
1110 STMFD R13!,{R0,R1,R14}
1120 ADR R12,xmult
1130 LDMIA R12,{R2-R5}
1140 SUBS x,x,R4
1150 BMI go
1160 SUBS y,y,R5
1170 BMI go
1180 FNmult(x,2,4)
1190 FNmult(y,3,5)
1200 MOV R2,R5
1210 MOV R1,R4
1220 MOV R0,#69
1230 SWI "OS_Plot"
1240 .go
1250 LDMFD R13!,{R0,R1,R15}
1260
1270 .xmult EQUD 0
1280 .ymult EQUD 0
1290 .xminus EQUD 0
1300 .yminus EQUD 0
1310
1320 .keypress
1330 STMFD R13!,{R0,R1,R14}
1340 MOV R0,#129
1350 MVN R1,#16
1360 MOV R2,#255
1370 SWI "OS_Byte"
1380 CMP R2,#255
1390 LDMFD R13!,{R0,R1,R15}
1400
1410 ]
1420 NEXT
1430 ENDPROC
1440 :
1450 DEF FNrand(A%)
1460 FOR T%=1 TO A%
1470 [OPT pass
1480 MOVS R11,R11,ASL#1
1490 EORCS R11,R11,R12
1500 ]
1510 NEXT
1520 =""
1530 :
1540 DEF FNmult(a,b,q)
1550 REM Multiply two 32 bit numbers together.
1560 p=8:r=9:s=10:temp1=11:sign=12
1570 [OPT pass
1580 MOV r,a
1590 MOV s,b
1600 EOR sign,r,s
1610 TST r,#1<<31
1620 RSBNE r,r,#0
1630 TST s,#1<<31
1640 RSBNE s,s,#0
1650 MOV temp1,r,LSR #16
1660 MOV p,s,LSR #16
1670 BIC r,r,temp1,LSL #16
1680 BIC s,s,p,LSL #16
1690 MUL q,r,s
1700 MUL s,temp1,s
1710 MUL r,p,r
1720 MUL p,temp1,p
1730 ADDS r,s,r
1740 ADDCS p,p,#&10000
1750 ADDS q,q,r,LSL #16
1760 ADC p,p,r,LSR #16
1770 TST sign,#1<<31
1780 RSBNE p,p,#0
1790 MOV q,q,LSR #sc
1800 ADD q,q,p,LSL #(32-sc)
1810 ]
1820 =""
1830 :
1840 DEF PROCzoom
1850 MOUSE TO 400,400
1860 MOUSE RECTANGLE 0,0,1140,1012
1870 size%=200
1880 GCOL 3,1
1890 PROCrec(X%,Y%,size%)
1900 REPEAT
1910 WAIT
1920 PROCrec(X%,Y%,size%)
1930 MOUSE X%,Y%,Z%
1940 IF Z%=1 AND size%>100 size%=size%-4
1950 IF Z%=4 AND size%<pixels% size%=size%+4
1960 PROCrec(X%,Y%,size%)
1970 UNTIL Z%=2
1980 xmin=xmin+X%/xscale:xmax=xmin+size%/xscale
1990 ymin=ymin+Y%/yscale:ymax=ymin+size%/yscale
2000 ENDPROC
2010 :
2020 DEF PROCrec(a,b,c)
2030 RECTANGLE a,b,c
2040 ENDPROC
2050 :
2060 DEF PROCtransformations
2070 PRINT "Current codes :"'
2080 RESTORE 2720
2090 READ number
2100 FOR T%=1 TO number
2110 READ name$
2120 PRINT T%;". ";name$
2130 NEXT
2140 RESTORE 2780
2150 PRINT '"Which image (1-";number;")?";:INPUT""A%
```

```
2160 IF A%<1 OR A%>number THEN 2150
2170 FOR T%=1 TO A%
2180 READ line%
2190 NEXT
2200 PROCgetdata
2210 ENDPROC
2220 :
2230 DEF PROCgetdata
2240 RESTORE line%
2250 READ num,space
2260 IF space=1 THEN PROCtrans2 ELSE PR
OCtrans1
2270 FOR T%=0 TO num-1
2280  READ prob
2290  prob%!(T%*4)=prob*scale
2300 NEXT
2310 READ xmin,ymin,xmax,ymax
2320 PROCinitial
2330 ENDPROC
2340 :
2350 DEF PROCtrans1
2360 FOR T%=0 TO num-1
2370 READ a11,a12,a21,a22,b1,b2
2380 PROCpoke(T%*24)
2390 NEXT
2400 ENDPROC
2410 :
2420 DEF PROCtrans2
2430 FOR T%=0 TO num-1
2440 READ r,s,theta,phi,h,k
2450 a11=r*COSRAD(theta)
2460 a12=-s*SINRAD(phi)
2470 a21=r*SINRAD(theta)
2480 a22=s*COSRAD(phi)
2490 b1=h
2500 b2=k
2510 PROCpoke(T%*24)
2520 NEXT
2530 ENDPROC
2540 :
2550 DEF PROCpoke(A%)
2560 trans%!A%=a11*scale
2570 trans%!(A%+4)=a12*scale
2580 trans%!(A%+8)=b1*scale
2590 trans%!(A%+12)=a21*scale
2600 trans%!(A%+16)=a22*scale
2610 trans%!(A%+20)=b2*scale
2620 ENDPROC
2630 :
2640 DEF PROCinitial
2650 A=(1-a11)
2660 B=(a12*b2)/(1-a22)
2670 C=(a21*a12)/(1-a22)
2680 x=(b1+B)/(A-C)
2690 y=(b2+a21*x)/(1-a22)
2700 ENDPROC
2710 :
2720 DATA 9
2730 DATA "fern leaf","Sierpinski trian
gle"
2740 DATA "Sierpinski carpet","leaf","K
och curve","Bush"
2750 DATA "Pythagorus triangle","Snowfl
ake"
2760 DATA "Tree"
2770 :
2780 DATA 2810,2910,3000,3140,3240,3340
2790 DATA 3440,3520,3660
2800 :
2810 REM data for fern
2820 DATA  4
2830 DATA  1
2840 DATA  0.0,   0.16,    0,    0,
0,   0
2850 DATA  0.85,  0.85, -2.5, -2.5,
0,  1.6
2860 DATA  0.3,   0.3,    49,   49,
0,  1.6
2870 DATA  0.3,   0.37,  120,  -50,
0,  0.44
2880 DATA  0.02, 0.7, 0.14, 0.14
2890 DATA -5,0,5,11
2900 :
2910 REM data for Sierpinski Gasket
2920 DATA 3
2930 DATA 0
2940 DATA 0.5, 0, 0, 0.5, 0.25, 0
2950 DATA 0.5, 0, 0, 0.5, 0, 0.5
2960 DATA 0.5, 0, 0, 0.5, 0.5, 0.5
2970 DATA 0.3334,0.3333,0.3333
2980 DATA 0,0,1,1
2990 :
3000 REM data for Sierpinski carpet
3010 DATA 8
3020 DATA 0
3030 DATA 0.3333, 0, 0, 0.3333,      0,
     0
3040 DATA 0.3333, 0, 0, 0.3333, 0.3333,
     0
3050 DATA 0.3333, 0, 0, 0.3333, 0.6666,
     0
3060 DATA 0.3333, 0, 0, 0.3333,      0,
0.3333
3070 DATA 0.3333, 0, 0, 0.3333, 0.6666,
0.3333
3080 DATA 0.3333, 0, 0, 0.3333,      0,
0.6666
3090 DATA 0.3333, 0, 0, 0.3333, 0.3333,
0.6666
3100 DATA 0.3333, 0, 0, 0.3333, 0.6666,
0.6666
3110 DATA 0.125 ,0.125, 0.125, 0.125, 0
.125, 0.125, 0.125, 0.125
3120 DATA 0,0,1,1
3130 :
3140 REM data for leaf
3150 DATA 4
3160 DATA 0
3170 DATA 0.6,    0,    0, 0.6,  0.18,
0.36
3180 DATA 0.6,    0,    0, 0.6,  0.18,
0.12
3190 DATA 0.4,  0.3, -0.3, 0.4,  0.27,
0.36
3200 DATA 0.4, -0.3,  0.3, 0.4,  0.27,
0.09
3210 DATA 0.25, 0.25, 0.25, 0.25
3220 DATA 0,0,1,1
3230 :
3240 REM data for Koch curve
3250 DATA 4
3260 DATA 1
3270 DATA 0.333, 0.333,   0,   0,     0
,    0
3280 DATA 0.333, 0.333,  -60,   -60, 0.
5,     0.2887
3290 DATA 0.333, 0.333,  60,  60, 0.333
,    0
3300 DATA 0.333, 0.333,   0,   0, 0.666
,    0
3310 DATA 0.25, 0.25, 0.25, 0.25
3320 DATA 0,-0.5,1,0.5
3330 :
3340 REM data for bush (tree)
3350 DATA 4
3360 DATA 1
3370 DATA 0, 0.53 , 0, 0, 0, 0
3380 DATA 0.5, 0.5,  30,  30, 0, 0.5
3390 DATA 0.5, 0.5, -30, -30, 0, 0.5
3400 DATA 0.5, 0.5,   0,   0, 0,   0
3410 DATA 0.25, 0.25, 0.25, 0.25
3420 DATA -0.5,0,0.5,1
3430 :
3440 REM data for Pythagorus triangle
3450 DATA 2
3460 DATA 1
3470 DATA 0.707, 0.707,  45,  45,  0.25
, 1.25
3480 DATA 0.707, 0.707, -45, -45, -0.25
, 1.25
3490 DATA 0.5,0.5
3500 DATA -2,0,2,4
3510 :
3520 REM Snowflake
3530 DATA 7
3540 DATA 1
3550 DATA 0.333, 0.333, 0, 0, 0.333, 0.
666
3560 DATA 0.333, 0.333, 0, 0,     0,
0.5
3570 DATA 0.333, 0.333, 0, 0, 0.666,
0.5
3580 DATA 0.333, 0.333, 0, 0,     0, 0.
166
3590 DATA 0.333, 0.333, 0, 0, 0.666, 0.
166
3600 DATA 0.333, 0.333, 0, 0, 0.333,
 0
3610 DATA 0.333, 0.333, 0, 0, 0.333, 0.
333
3620 DATA 0.143, 0.143, 0.143, 0.143
3630 DATA 0.143, 0.143, 0.143
3640 DATA -0.25,-0.25,1.25,1.25
3650 :
3660 REM Tree
3670 DATA 4
3680 DATA 1
3690 DATA 0.6, 0.6, 30, 30, 0, 0.4
3700 DATA 0.6, 0.6, -30, -30,  0, 0.4
3710 DATA 0.5, 0.5, -15,-15, 0, 0.4
3720 DATA   0, 0.42,   0,  0,  0,  0
3730 DATA 0.3, 0.3, 0.2, 0.2
3740 DATA -0.5,0,0.5,1
```

Listing 3 - AccentSRC

```
  10 REM >AccentSrc (Info3)
  20 REM by J M Faber
  30 REM for 32-bit machines
  40 REM (c) BAU August 1992
  50 :
  60 DIM code% 1000
  70 name$="Accent"
  80 sp=13:link=14:pc=15
  90 FOR pass%=4 TO 6 STEP 2
 100 P%=0:O%=code%
 110 [OPT pass%
 120 EQUD    0
 130 EQUD    init%
 140 EQUD    finish%
 150 EQUD    0
 160 EQUD    title%
 170 EQUD    helptext%
 180 EQUD    0
 190
 200 .title% EQUS    name$
 210 EQUB    0
 220 ALIGN
 230 .helptext%
 240 EQUS    name$+CHR$9+CHR$9+"1.00 ("
+MID$(TIME$,5,11)+")"
 250 EQUB    0
 260 ALIGN
 270
 280 .init%  STMFD   (sp)!,{R0-R12,link
}
 290 MOV     R0,#&10
 300 ADR     R1,handler%
 310 ADR     R2,workspace%
 320 SWI     "XOS_Claim"
 330 MOV     R0,#14
 340 MOV     R1,#11
 350 SWI     "XOS_Byte"
 360 LDMFD   (sp)!,{R0-R12,pc}
 370
 380 .finish%
 390 STMFD   (sp)!,{R0-R12,link}
 400 MOV     R0,#13
 410 MOV     R1,#11
 420 SWI     "XOS_Byte"
 430 MOV     R0,#&10
 440 ADR     R1,handler%
 450 ADR     R2,workspace%
 460 SWI     "XOS_Release"
 470 LDMFD   (sp)!,{R0-R12,pc}
 480
 490 .handler%
 500 CMP     R0,#11
 510 MOVNE   PC,R14
 520 CMP     R2,#&5E
 530 STREQ   R1,[R12]
 540 MOVEQ   PC,R14
 550 CMP     R1,#0
 560 MOVEQ   PC,R14
 570 STMFD   R13!,{R0-R12,R14}
 580 LDR     R0,[R12]
 590 TEQ     R0,#0
 600 BEQ     exithandler%
 610 CMP     R2,R0,LSR #8
 620 ANDLT   R0,R0,#&FF00
 630 ORRLT   R0,R0,R2
 640 MOVGT   R0,R0,LSR #8
 650 ORRGT   R0,R0,R2,LSL #8
 660 STR     R0,[R12]
 670 LDR     R0,[R12,#4]
 680 CMP     R0,#0
 690 BNE     exithandler%
 700 MOV     R1,#1
 710 STR     R1,[R12,#4]
 720 ADR     R0,callback%
 730 ADR     R1,workspace%
 740 MOV     R9,PC
 750 ORR     R8,R9,#3
 760 TEQP    R8,#0
 770 MOVNV   R0,R0
 780 STMFD   R13!,{R14}
 790 SWI     "XOS_AddCallBack"
 800 LDMFD   R13!,{R14}
 810 TEQP    R9,#0
 820 MOVNV   R0,R0
 830 .exithandler%
 840 LDMFD   R13!,{R0-R12,R15}
 850
 860 .callback%
 870 STMFD   R13!,{R0-R12,R14}
 880 LDR     R2,[R12]
 890 ADR     R0,data%
 900 .loop   LDR     R3,[R0],#4
 910 TEQ     R3,#0
 920 BEQ     exitcallback%
 930 CMP     R2,R3,LSR #16
 940 BNE     loop
 950 MOV     R0,#202
 960 MOV     R1,#0
 970 MOV     R2,#255
 980 SWI     "XOS_Byte"
 990 TST     R1,#%10000000
1000 EORNE   R1,R1,#%11000
1010 EOR     R1,R1,#%10000
1020 TST     R1,#%11000
1030 MOVNE   R3,R3,LSR #8
1040 MOV     R0,#153
1050 MOV     R1,#0
1060 MOV     R2,#0
1070 SWI     "XOS_Byte"
1080 MOV     R1,#0
1090 AND     R2,R3,#&FF
1100 SWI     "XOS_Byte"
1110 .exitcallback%
1120 MOV     R1,#0
1130 STR     R1,[R12,#4]
1140 LDMFD   R13!,{R0-R12,R15}
1150
1160 .data%  EQUD    &3C33C0E0
1170 EQUD    &573CC1E1
1180 EQUD    &3C16C2E2
1190 EQUD    &463CC4E4
1200 EQUD    &3C29C6E6
1210 EQUD    &3329C8E8
1220 EQUD    &5729C9E9
1230 EQUD    &2916CAEA
1240 EQUD    &4629CBEB
1250 EQUD    &332ECCEC
1260 EQUD    &572ECDED
1270 EQUD    &2E16CEEE
1280 EQUD    &462ECFEF
1290 EQUD    &3E1CD0F0
1300 EQUD    &332FD2F2
1310 EQUD    &572FD3F3
1320 EQUD    &2F16D4F4
1330 EQUD    &462FD6F6
1340 EQUD    &332DD9F9
1350 EQUD    &572DDAFA
1360 EQUD    &2D16DBFB
1370 EQUD    &462DDCFC
1380 EQUD    &3115C7E7
1390
1400 EQUD    &46319094
1410 EQUD    &46329195
1420 EQUD    &1D1C9C8F
1430 EQUD    0
1440
1450 ;EQUD   &2F299A9B
1460 ;EQUD   &3F2E9E9E
1470 ;EQUD   &3F2E9E9E
1480
1490 .workspace%
1500 EQUD    0
1510 EQUD    0
1520 ]:NEXT  pass%
1530 name$="Accent"
1540 SYS "OS_File",10,name$,&FFA,,code%
,O%
1550 PRINT"Module saved as '"name$"'"
1560 OSCLI"RMLoad "+name$
1570 END
```

Listing 4 - 3DStars

```
  10 REM >3Dstars (Info4)
  20 REM by Richard T-W and Matthew G
  30 REM for eight bit machines
  40 REM (c) BBC Acorn User August 1992
  50 :
  60 MODE 2
  70 VDU 23;8202;0;0;0;
  80 VDU 23;1,64,0;0;0;
  90 VDU 23;2,91,0;0;0;
 100 VDU 23;12,&40 DIV8,0;0;0;
 110 HIMEM=&3400
 120 PRINT TAB(1,8);"Please wait..."
 130 PROCinit
 140 PROCassemble
 150 PRINT TAB(1,8);SPC(16)
 160 ?accel=10
 170 ?spin=0
 180 ?inertia=0
 190 CALL start
 200 END
 210 :
 220 DEF PROCinit
 230 num%=64
 240 maxrad%=SQR(128*128*2)
 250 code%   = &900
 260 scrnlo% = &3400
 270 scrnhi% = &3500
 280 sin%    = &3600
 290 cos%    = sin%+&40
 300 sinsgn% = &3740
 310 cossgn% = sinsgn%+&40
 320 coltab% = &3900
 330 :
 340 FOR N%=0 TO 255
 350 A%=&4000+(N% DIV 8)*512+(N% AND 7)
 360 N%?scrnlo% = A% AND 255
 370 N%?scrnhi% = A% DIV 256
 380 NEXT
 390 FOR N%=0 TO 319
 400 A%=SIN(N%*2*PI/256)*128
 410 N%?sin%    = ABS(A%)
 420 N%?sinsgn% = -(SGN(A%)=-1)
 430 NEXT
 440 FOR N%=0 TO maxrad%-1
 450 N%?coltab% = N%/(maxrad%/7)+1
 460 NEXT
 470 :
 480 distlo%  = &3A00
 490 disthi%  = &3A80
 500 speedlo% = &3B00
 510 speedhi% = &3B80
 520 angle%   = &3C00
 530 oldc%    = &3C80
 540 oldx%    = &3D00
 550 oldy%    = &3D80
 560 flag%    = &3E00
 570 :
 580 FOR N%=0 TO num%-1
 590 N%?distlo%  = RND(256)
 600 N%?disthi%  = RND(maxrad%)
 610 N%?speedlo% = RND(256)
 620 N%?speedhi% = RND(2)-1
 630 N%?angle%   = RND(256)
 640 N%?flag%    = 1
 650 NEXT
 660 ENDPROC
 670 :
 680 DEF PROCassemble
 690 x=&70
 700 y=&71
 710 c=&72
 720 write=&73
 730 num1=&75
 740 num2=&76
 750 result=&77
 760 temp=&79
 770 storeX=&7A
 780 preserve=&7B
 790 rndnum=&7C
 800 accel=&7D
 810 spin=&7E
 820 inertia=&7F
 830 FOR N%=0 TO 2 STEP 2
 840 P%=code%
 850 [OPT N%
 860 .plot
 870 STX preserve
 880 LDA x
 890 AND #&FC
 900 STA write
 910 LDA #0
 920 ASL write
 930 ROL A
 940 STA write+1
 950 LDY y
 960 CLC
 970 LDA scrnlo%,Y
 980 ADC write
 990 STA write
1000 LDA scrnhi%,Y
1010 ADC write+1
1020 STA write+1
1030 LDA x
1040 LSR A
1050 AND #1
1060 TAY
1070 LDA mask,Y
1080 LDX c
1090 AND colours,X
1100 LDY #0
1110 EOR (write),Y
1120 STA (write),Y
1130 LDX preserve
1140 RTS
1150 :
1160 .mask
```

```
1170 EQUW &55AA
1180 .colours
1190 EQUD &33033000
1200 EQUD &3F0F3C0C
1210 .bitmask
1220 EQUD &08040201
1230 EQUD &80402010
1240 :
1250 .multiply
1260 STX preserve
1270 LDA #0
1280 STA result+1
1290 LDA num1
1300 STA result
1310 LDX #8
1320 .mult2
1330 CLC
1340 LDA result
1350 AND #1
1360 BEQ mult3
1370 LDA num2
1380 ADC result+1
1390 STA result+1
1400 .mult3
1410 ROR result+1
1420 ROR result
1430 DEX
1440 BNE mult2
1450 LDX preserve
1460 LDA result+1
1470 ASL result
1480 ROL A
1490 RTS
1500 :
1510 .clc_sec
1520 EQUB &18  \Opcode for CLC
1530 EQUB &38  \Opcode for SEC
1540 .adc_sbc
1550 EQUB &69  \Opcode for ADC #
1560 EQUB &E9  \Opcode for SBC #
1570 :
1580 .start
1590 SEI
1600 LDA #&7F
1610 STA &FE43
1620 LDA #&FF
1630 STA &FE42
1640 LDA #3
1650 STA &FE40
1660 :
1670 .starfield
1680 LDA inertia
1690 BEQ atzero
1700 CMP #21
1710 BCS negative
1720 DEC inertia
1730 BCC atzero
1740 .negative
1750 INC inertia
1760 .atzero
1770 LDA #97
1780 JSR key
1790 BPL notleft
1800 DEC inertia
1810 DEC inertia
1820 LDA inertia
1830 CMP #235
1840 BCS notleft
1850 LDA #235
1860 STA inertia
1870 .notleft
1880 LDA #66
1890 JSR key
1900 BPL notright
1910 INC inertia
1920 INC inertia
1930 LDA inertia
1940 CMP #21
1950 BCC notright
1960 LDA #20
1970 STA inertia
1980 .notright
1990 CLC
2000 LDA inertia
2010 ASL A
2020 LDA inertia
2030 ROR A
2040 ADC spin
2050 STA spin
2060 :
2070 LDA #72
2080 JSR key
2090 BPL notup
2100 INC accel
2110 LDA accel
2120 CMP #100
2130 BCC notup
2140 LDA #100
2150 STA accel
2160 .notup
2170 LDA #104
2180 JSR key
2190 BPL notdown
2200 DEC accel
2210 BPL notdown
2220 LDA #0
2230 STA accel
2240 .notdown
2250 LDA #112
2260 JSR key
2270 BPL notesc
2280 LDA #11
2290 STA &FE40
2300 CLI
2310 RTS
2320 .notesc
2330 :
2340 LDX #0
2350 .loop
2360 LDA flag%,X
2370 BNE skipthis
2380 LDA oldx%,X
2390 STA x
2400 LDA oldy%,X
2410 STA y
2420 LDA oldc%,X
2430 STA c
2440 JSR plot
2450 .skipthis
2460 LDA #0
2470 STA flag%,X
2480 LDA angle%,X
2490 CLC
2500 ADC spin
2510 TAY
2520 LDA sin%,Y
2530 STA num1
2540 LDA disthi%,X
2550 STA num2
2560 JSR multiply
2570 BMI dontplot
2580 STA poke2+1
2590 LDA sinsgn%,Y
2600 TAY
2610 LDA clc_sec,Y
2620 STA poke1
2630 LDA adc_sbc,Y
2640 STA poke2
2650 LDA #128
2660 .poke1
2670 CLC
2680 .poke2
2690 ADC #0
2700 STA x
2710 STA oldx%,X
2720 LDA angle%,X
2730 CLC
2740 ADC spin
2750 TAY
2760 LDA cos%,Y
2770 STA num1
2780 JSR multiply
2790 BMI dontplot
2800 STA poke4+1
2810 LDA cossgn%,Y
2820 TAY
2830 LDA clc_sec,Y
2840 STA poke3
2850 LDA adc_sbc,Y
2860 STA poke4
2870 LDA #128
2880 .poke3
2890 CLC
2900 .poke4
2910 ADC #0
2920 STA y
2930 STA oldy%,X
2940 LDY disthi%,X
2950 LDA coltab%,Y
2960 STA c
2970 STA oldc%,X
2980 JSR plot
2990 JMP setflag
3000 .dontplot
3010 LDA #1
3020 STA flag%,X
3030 .setflag
3040 :
3050 CLC
3060 LDA distlo%,X
3070 ADC speedlo%,X
3080 STA distlo%,X
3090 LDA disthi%,X
3100 ADC speedhi%,X
3110 CMP #maxrad%
3120 BCS newpos
3130 STA disthi%,X
3140 .continue
3150 CLC
3160 LDA speedlo%,X
3170 ADC accel
3180 STA speedlo%,X
3190 BCC inchigh
3200 INC speedhi%,X
3210 .inchigh
3220 INX
3230 CPX #num%
3240 BEQ nextframe
3250 JMP loop
3260 .nextframe
3270 BIT &FF
3280 BMI exit
3290 JMP starfield
3300 .exit
3310 RTS
3320 :
3330 .newpos
3340 JSR rnd
3350 STA speedlo%,X
3360 JSR rnd
3370 AND #1
3380 STA speedhi%,X
3390 JSR rnd
3400 STA angle%,X
3410 LDA #0
3420 STA distlo%,X
3430 JSR rnd
3440 AND #7
3450 CLC
3460 ADC #6
3470 STA disthi%,X
3480 JMP continue
3490 :
3500 .rnd
3510 LDA #0
3520 STA rndnum
3530 LDY #8
3540 .rnd2
3550 ASL seed
3560 ROL seed+1
3570 BCC rnd3
3580 LDA seed
3590 EOR #&41
3600 STA seed
3610 LDA seed+1
3620 EOR #&2B
3630 STA seed+1
3640 .rnd3
3650 ROL rndnum
3660 DEY
3670 BNE rnd2
3680 LDA rndnum
3690 RTS
3700 :
3710 .seed
3720 EQUW TIME
3730 :
3740 .key
3750 STA &FE4F
3760 BIT &FE4F
3770 RTS
3780 ]
3790 NEXT
3800 ENDPROC
```

Listing 5 - WavesBasic

```
10 REM >WavesBasic (Info5)
20 REM by Michel Grimminck
30 REM for 32-bit machines
40 REM (c) BAU August 1992
50 :
60 ON ERROR MODE0:REPORT:PRINT" at li
ne ";ERL:END
70 INPUT "Number of point in x-direct
ion (default=10) ";n
80 IF n=0 n=10
90 b1%=1
100 b2%=2
110 sc=800
120 MODE 0
130 ORIGIN 240,312
140 OFF
150 MOUSE TO 0,0
160 DIM y(n,n),vy(n,n)
170 REPEAT
180 MOUSE h,y(1,1),a
190 y(0,0)=y(1,1)
200 y(0,1)=y(1,1)
210 y(1,0)=y(1,1)
220 FOR x%=1 TO n-1
230 FOR y%=1 TO n-1
240 f=y(x%-1,y%)+y(x%+1,y%)+y(x%,y%+1)
+y(x%,y%-1)-4*y(x%,y%)
250 vy(x%,y%)=0.999*vy(x%,y%)+f/40
260 NEXT
270 NEXT
280 vy(1,1)=0
290 y()=y()+vy()
300 FOR x=0 TO n
310 y(x,0)=y(x,1)
320 y(x,n)=y(x,n-1)
330 NEXT
340 FOR y=1 TO n-1
350 y(0,y)=y(1,y)
360 y(n,y)=y(n-1,y)
370 NEXT
380 WAIT
390 SYS 6,112,b1%
400 SYS 6,113,b2%
410 SWAP b1%,b2%
420 CLS
430 PRINT "Move mouse in vertical dire
ction"
440 l=sc/n*.5
450 FOR y=1 TO n-1
460 y1=y*l
470 MOVE sc/n,y*sc/n*.5+y(1,y)
480 FOR x=1 TO n-1
490 DRAW x*l*2,y1+y(x,y)
500 NEXT
510 NEXT
520 FOR x=1 TO n-1
530 x1=x*sc/n
540 MOVE x1,y(x,1)+l
550 FOR y=1 TO n-1
560 DRAW x1,y*l+y(x,y)
570 NEXT
580 NEXT
590 UNTIL FALSE
```

Listing 6 - Waves

```
10 REM >Waves (Info6)
20 REM "Vibrating plate"
30 REM by Michel Grimminck
40 REM for 32-bit machines
50 REM (c) BAU August 1992
60 :
70 MODE 0
80 INPUT "Size (logarithmic scale, de
fault=6, max=7)";n
90 IF n=0 THEN n=6
100 INPUT "Friction (logaritmic scale,
 default=10)";fr
110 IF fr=0 THEN fr=10
120 INPUT "Wave velocity (logaritmic s
cale, default=8, max=10)";velo
130 IF velo=0 THEN velo=8
140 max=2^n
150 DIM wave 600,h max*max*4,vel max*m
ax*4,p 16
160 f=20-fr
170 IF f<1 THEN f=1
180 velo=12-velo
190 IF velo<1 THEN velo=1
200 bold=0
210 b=0
220 ac=14
230 F%=ac
240 op=2^ac
250 MODE 13
260 ORIGIN 640,512
270 OFF
280 PROCreadwave
290 MOUSE RECTANGLE0,-4000,0,8000
300 p!0=148
310 p!4=-1
320 SYS "OS_ReadVduVariables",p,p+8
330 E%=p!8+320*(128-max/2)+160-max/2
340 FOR t%=0 TO max*max*4-1
350 h!t%=0
360 vel!t%=0
370 NEXT
380 PRINTTAB(0,0);"Move mouse in verti
cal direction,"'"Mouse buttons to change
 scale"
390 REPEAT
400 REPEAT
410 bold=b
420 MOUSE x,y,b
430 !FNxy(max/4,max/3)=y*op/4
440 CALL wave
450 UNTIL b<>0 AND b<>bold
460 IF b=1 F%+=1
470 IF b=4 F%-=1
480 IF b=2 F%=ac
490 bold=b
500 UNTIL FALSE
510 :
520 DEF FNxy(x%,y%)
530 =h+4*(max*y%+x%)
540 :
550 DEF PROCreadwave
560 x=0:y=1:u=2:v=3
570 scr=4:pr=5:som=6:user=8
580 user2=12:H%=vel
590 FOR pass=0 TO 2 STEP 2
600 P%=wave
610 [OPT pass
620 MOV      x,#max
630 ADR      u,h
640 .loop1  LDR     user,[u,#max*4]
650 STR      user,[u],#4
660 SUBS     x,x,#1
670 BNE      loop1
680 MOV      x,#max
690 ADR      u,h
700 ADD      u,u,#max*(max-2)*4
710 .loop2  LDR     user,[u,#0]
720 STR      user,[u,#max*4]
730 ADD      u,u,#4
740 SUBS     x,x,#1
750 BNE      loop2
760 MOV      y,#1
770 ADR      u,h
780 .loop3  ADD     u,u,#max*4
790 LDR      user,[u,#4]
800 STR      user,[u,#0]
810 LDR      user,[u,#4*(max-2)]
820 STR      user,[u,#4*(max-1)]
830 ADD      y,y,#1
840 CMP      y,#max-1
850 BNE      loop3
860 MOV      y,#1
870 .yloop  MOV     x,#1
880 ADR      u,h
890 ADD      u,u,y,LSL #n+2
900 MOV      v,r7
910 ADD      v,v,y,LSL #n+2
920 .xloop  MOV     som,#0
930 ADD      user,u,x,LSL #2
940 LDR      som,[user,#-4]
950 LDR      user2,[user,#4]
960 ADD      som,som,user2
970 LDR      user2,[user,#4*max]
980 ADD      som,som,user2
990 LDR      user2,[user,#-4*max]
1000 ADD     som,som,user2
1010 LDR     user2,[user,#0]
1020 SUB     som,som,user2,LSL #2
1030 LDR     user2,[v,x,LSL #2]
1040 ADD     user2,user2,som,ASR #velo
1050 SUB     user2,user2,user2,ASR #f
1060 STR     user2,[v,x,LSL #2]
1070 ADD     x,x,#1
1080 CMP     x,#max-1
1090 BNE     xloop
1100 ADD     y,y,#1
1110 CMP     y,#max-1
1120 BNE     yloop
1130 ADR     u,h
1140 MOV     v,r7
1150 ADD     r0,u,#2^(2*n+2)
1160 .copy   LDR     user,[u],#4
1170 LDR     user2,[v],#4
1180 ADD     user,user,user2
1190 STR     user,[u,#-4]
1200 CMP     u,r0
1210 BNE     copy
1220 ADR     r11,kleur
1230 MOV     y,#1
1240 .yloop2 MOV     x,#1
1250 ADR     u,h
1260 ADD     u,u,y,LSL #n+2
1270 ADD     user2,scr,y,LSL #6
1280 ADD     user2,user2,y,LSL #8
1290 .xloop2 LDR     user,[u,x,LSL #2]
1300 MOV     user,user,ASR pr
1310 AND     user,user,#%1111111
1320 LDRB    user,[r11,user]
1330 STRB    user,[user2,x]
1340 ADD     x,x,#1
1350 CMP     x,#max
1360 BNE     xloop2
1370 ADD     y,y,#1
```

```
1380 CMP     y,#max
1390 BNE     yloop2
1400 MOV     PC,r14
1410 .kleur
1420 ]
1430 NEXT
1440 FOR q=0 TO 127 STEP 32
1450 s=0
1460 READ a$,ch
1470 FOR t=0 TO 31
1480 a=EVAL("&"+MID$(a$,t*2+1,2))
1490 kleur?(q+t)=a:s+=a
1500 NEXT
1510 IF s<>ch THEN PRINT'"Checksum erro
r at data-line ";q/32+1
1520 NEXT
1530 ENDPROC
1540 :
1550 DATA FFDFDEDDDCB3B2B1B00F0E0D0C0D0
E0F98999ABABBBAB9B887868584919293,4451
1560 DATA BCBDBEBFB7B6B5B41B1A1918191A1
B94B4B5B6B73F3E3D3C1312111014151617,2940
1570 DATA 163D3E3F3FD6D7D6D5D43B3A39380
706050430313233 5C5D5E5D5556577C7475,2776
1580 DATA 76777FF7F6F5F45B5A59582726252
4202100000102032C2D2ED0D1D2D3FCFDFE,3657
```

Listing 7 - Scroll7

```
  10 REM >Scroll7 - Mode 7 Scrolltext (
Info7)
  20 REM By Richard Talbot-Watkins
  30 REM and Matthew Godbolt
  40 REM For 8 bit machines
  50 REM (C) BBC Acorn User August 1992
  60 :
  70 MODE 7
  80 PROCassemble
  90 PROCsave
 100 PROCdemo
 110 END
 120 :
 130 DEF PROCassemble
 140 addr=&70
 150 textptr=&72
 160 bit=&74
 170 temp=&75
 180 in1=&76
 190 in2=&77
 200 in3=&78
 210 out1=&79
 220 out2=&7A
 230 out3=&7B
 240 chardef=&80
 250 :
 260 eventv=&220
 270 osbyte=&FFF4
 280 osword=&FFF1
 290 :
 300 line=22
 310 :
 320 FOR N%=0 TO 2 STEP 2
 330 P%=&900
 340 [OPT N%
 350 .start
 360 LDA eventv+1
 370 CMP #9
 380 BEQ nochange
 390 LDA #(event MOD 256)
 400 STA eventv
 410 LDA #(event DIV 256)
 420 STA eventv+1
 430 .nochange
 440 LDA #14
 450 LDX #4
 460 JSR osbyte
 470 LDA addr
 480 STA textptr
 490 LDA addr+1
 500 STA textptr+1
 510 LDA #0
 520 STA bit
 530 LDA #151
 540 STA &7C00+line*40
 550 STA &7C28+line*40
 560 STA &7C50+line*40
 570 RTS
 580 :
 590 .event
 600 LDY #0
 610 LDA (textptr),Y
 620 CMP #13
 630 BNE nottheend
 640 LDA addr
 650 STA textptr
 660 LDA addr+1
 670 STA textptr+1
 680 LDA (textptr),Y
 690 .nottheend
 700 STA chardef
 710 LDA #10
 720 LDX #(chardef MOD 256)
 730 LDY #(chardef DIV 256)
 740 JSR osword
 750 LDX bit
 760 :
 770 LDA #0
 780 STA in1
 790 LDA chardef+1
 800 JSR getbit
 810 ASL A
 820 ASL A
 830 ASL A
 840 STA in2
 850 LDA chardef+2
 860 JSR getbit
 870 JSR mult64
 880 STA in3
 890 OPT FNshift(&7C00+line*40)
 900 LDA chardef+3
 910 JSR getbit
 920 ASL A
 930 STA in1
 940 LDA chardef+4
 950 JSR getbit
 960 ASL A
 970 ASL A
 980 ASL A
 990 STA in2
1000 LDA chardef+5
1010 JSR getbit
1020 JSR mult64
1030 STA in3
1040 OPT FNshift(&7C28+line*40)
1050 LDA chardef+6
1060 JSR getbit
1070 ASL A
1080 STA in1
1090 LDA chardef+7
1100 JSR getbit
1110 ASL A
1120 ASL A
1130 ASL A
1140 STA in2
1150 LDA chardef+8
1160 JSR getbit
1170 JSR mult64
1180 STA in3
1190 OPT FNshift(&7C50+line*40)
1200 :
1210 INC bit
1220 LDA bit
1230 CMP #8
1240 BNE continue
1250 LDA #0
1260 STA bit
1270 INC textptr
1280 BNE continue
1290 INC textptr+1
1300 .continue
1310 RTS
1320 :
1330 .getbit
1340 AND masktable,X
1350 BNE giveone
1360 LDA #0
1370 RTS
1380 .giveone
1390 LDA #1
1400 RTS
1410 :
1420 .masktable
1430 EQUD &10204080
1440 EQUD &01020408
1450 :
1460 .mult64
1470 ASL A
1480 ASL A
1490 ASL A
1500 ASL A
1510 ASL A
1520 ASL A
1530 RTS
1540 :
1550 .shift
1560 STA temp
1570 AND #1
1580 STA out1
1590 LDA temp
1600 AND #4
1610 STA out2
1620 LDA temp
1630 AND #16
1640 STA out3
1650 LSR temp
1660 LDA temp
1670 AND #&EF
1680 STA temp
1690 AND #32
1700 LSR A
1710 ORA temp
1720 ORA #&A0
1730 AND #&B5
1740 ORA in1
1750 ORA in2
1760 ORA in3
1770 STA temp
1780 LDA out1
1790 ASL A
1800 STA in1
1810 LDA out2
1820 ASL A
1830 STA in2
1840 LDA out3
1850 ASL A
1860 ASL A
1870 STA in3
1880 LDA temp
1890 RTS
1900 ]
1910 NEXT
1920 ENDPROC
1930 :
1940 DEF FNshift(addr%)
1950 [OPT N%
1960 LDY #39
1970 .loop
1980 LDA addr%,Y
1990 JSR shift
2000 STA addr%,Y
2010 DEY
2020 BNE loop
2030 ]
2040 =N%
2050 :
2060 DEF PROCsave
2070 PRINT "Saving code as '7Scroll'"
2080 OSCLI "Save 7Scroll 900 "+STR$~P%
2090 ENDPROC
2100 :
2110 DEF PROCdemo
2120 $&C00="Welcome to yet another Mode
 7 scrolltext!  This one's a bit differe
nt because it scrolls big characters smo
othly across the screen, and it's event
driven so you can leave it running as a
background task....    "
2130 !&70=&C00
2140 *RUN 7Scroll
2150 PRINT TAB(0,21);CHR$132;CHR$157;
2160 VDU 28,0,19,39,0,10
2170 ENDPROC
```

Listing 8 - Clash

```
  10 REM >Clash (Info8)
  20 REM by Tris Mabbs
  30 REM updated for Masters by Cliff B
lake
  40 REM for 8-bit machines
  50 REM (c) BAU July 1992
  60 :
  70 MODE 7
  80 *FX 229,1
  90 VDU 23;8202;0;0;0;0
 100 VDU 28,0,19,39,4
 110 DIM K$(8,16),K%(8,16)
 120 FOR I%=1 TO 16
 130 FOR J%=1 TO 8
 140 READ k$
 150 K$(J%-1,I%-1)=k$
 160 VDU 31,(J%-1)*5,I%-1,135
 170 PRINT;k$;
 180 NEXT
 190 NEXT
 200 REPEAT
 210 FOR I%=1 TO 127
 220 IF INKEY-I% PROCkey(I%)
 230 NEXT
 240 UNTIL FALSE
 250 :
 260 DEF PROCkey(in%)
 270 x%=(in%-1) DIV 16
 280 y%=(in%-1) MOD 16
 290 K%(x%,y%)=5
 300 VDU 31,x%*5,y%,135-K%(x%,y%)
 310 PROCclash
 320 VDU 7
 330 REPEAT UNTIL NOT INKEY-in%
 340 ENDPROC
 350 :
 360 DEF PROCclash
 370 FOR X%=0 TO 7
 380 IF X%<>x% PROCy
 390 NEXT
 400 ENDPROC
 410 :
 420 DEF PROCy
 430 FOR Y%=0 TO 15
 440 IF Y%<>y% PROCq
 450 NEXT
 460 ENDPROC
 470 :
 480 DEF PROCq
 490 IF K%(x%,Y%)=5 AND K%(X%,Y%)=5 PRO
Cm(X%,y%)
 500 IF K%(X%,Y%)=5 AND K%(X%,y%)=5 PRO
Cm(x%,Y%)
 510 IF K%(X%,y%)=5 AND K%(x%,Y%)=5 PRO
Cm(X%,Y%)
 520 ENDPROC
 530 :
 540 DEF PROCm(x,y)
 550 VDU 31,x*5,y,129
 560 ENDPROC
 570 :
 580 DATA Shft,Q,f0,1,CpLk,ShLk,Tab,Esc
 590 DATA Ctrl,3,W,2,A,S,Z,f1
 600 DATA b7,4,E,D,X,C,Spce,f2
 610 DATA b6,5,T,R,F,G,V,f3
 620 DATA b5,f4,7,6,Y,H,B,f5
 630 DATA b4,8,I,U,J,N,M,f6
 640 DATA b3,f7,9,O,K,L,",",f8
 650 DATA b2,-,0,P,@,;,.,f9
 660 DATA b1,^,_,[,:,],/,\
 670 DATA b0,Left,Down,Up,Ret,Del,Copy,
Rght
 680 DATA ?,p6,p8,p+,p/,p#,p0,p4
 690 DATA ?,p7,p9,p-,pDel,p*,p1,p5
 700 DATA ?,?,?,pRet,p.,"p,",p3,p2
 710 DATA ?,?,?,?,?,?,?,?
 720 DATA ?,?,?,?,?,?,?,?
 730 DATA ?,?,?,?,?,?,?,?
```

Listing 9 - DateSRC

```
  10 REM >DateSrce (Info9)
  20 REM Source for !DateFix !run file
  30 REM by J B Pickard
  40 REM for 32-bit machines
  50 REM (c) BAU August 1992
  60 :
  70 DIM code% 512
  80 FOR N%=0 TO 3 STEP 3
  90 P%=code%
 100 [OPT N%
 110 .start  MOV     R0,#253
 120 MOV     R1,#0
 130 MOV     R2,#255
 140 SWI     "OS_Byte"
 150 CMP     R1,#1
 160 BNE     exit
 170 ADR     R6,stringdate%
 180 ADR     R7,filestringdate%
 190 ADR     R8,datestringformat%
 200 MOV     R0,#3
 210 STRB    R0,date%
 220 MOV     R0,#14
 230 ADR     R1,date%
 240 SWI     "OS_Word"
 250 ADR     R0,date%
 260 MOV     R1,R6
 270 ADD     R1,R1,#1
 280 MOV     R2,#16
 290 MOV     R3,R8
 300 SWI     "OS_ConvertDateAndTime"
 310 MOV     R0,#17
 320 ADR     R1,filename
 330 SWI     "OS_File"
 340 MOV     R4,#&FF
 350 AND     R4,R2,R4
 360 STR     R3,fdate%
 370 STRB    R4,(fdate%+4)
 380 ADR     R0,fdate%
 390 MOV     R1,R7
 400 ADD     R1,R1,#1
 410 MOV     R2,#16
 420 MOV     R3,R8
 430 SWI     "OS_ConvertDateAndTime"
 440 MOV     R0,#0
 450 ADR     R1,(filestringdate%+12)
 460 SWI     "OS_ReadUnsigned"
 470 MOV     R8,R2
 480 ADR     R1,(stringdate%+12)
 490 SWI     "OS_ReadUnsigned"
 500 MOV     R9,#0
 510 .loop   CMP     R8,R2
 520 ADDHI   R2,R2,#4
 530 ADDHI   R9,R9,#1
 540 BHI     loop
 550 MOV     R10,R2
 560 CMP     R9,#0
 570 MOVGT   R0,R2
 580 ADDGT   R1,R6,#12
 590 MOVGT   R2,#4
 600 SWIGT   "OS_BinaryToDecimal"
 610 MOVGT   R0,#15
 620 .update STRGTB  R0,[R6,#0]
 630 MOVGT   R1,R6
 640 SWIGT   "OS_Word"
 650 CMP     R8,R10
 660 BHI     exit
 670 LDR     R0,[R6,#4]
 680 LDR     R1,[R6,#8]
 690 LDR     R2,allow
 700 LDR     R3,(allow+4)
 710 CMP     R1,R3
 720 BNE     exit
 730 CMP     R0,R2
 740 BGE     exit
 750 ADR     R1,filename
 760 MOV     R5,#3
 770 MOV     R0,#4
 780 SWI     "OS_File"
 790 MOV     R0,#9
 800 SWI     "OS_File"
 810 MOV     R0,#4
 820 MOV     R5,#9
 830 SWI     "OS_File"
 840 .exit   MOV     R15,R14
 850
 860 .filename
 870 EQUS    "<obey$dir>.!run"
 880 EQUB    &00
 890 ALIGN
 900
 910 .datestringformat%
 920 EQUS    "%W3,%DY %M3 %CE%YR"
 930 EQUB    0
 940 ALIGN
 950
 960 .stringdate%
 970 EQUD    0
 980 EQUD    0
 990 EQUD    0
1000 EQUD    0
1010 .filestringdate%
1020 EQUD    0
1030 EQUD    0
1040 EQUD    0
1050 EQUD    0
1060 .date%
1070 EQUD    0
1080 EQUD    0
1090 .fdate%
1100 EQUD    0
1110 EQUD    0
1120 .allow
1130 EQUS    ",13 Jan "
1140 ]
1150 NEXT
1160 OSCLI("SAVE !Run "+STR$~code%+" "+
STR$~(P%+1))
1170 OSCLI("SETTYPE !Run FF8")
1180 OSCLI("STAMP !Run")
1190 END
```

Listing 10 - Aura

```
  10 REM >Aura By Richard Talbot-Watkin
s and Matthew Godbolt (C) BAU August 199
2
  20 MODE2:VDU23;8202;0;0;0;29,448;448;
:FORN=0TO7STEP2:VDU19,N,N/2;0;19,N+1,4+(
N/2);0;:NEXT:FORy=-112TO112:FORx=-112TO1
12STEP2:d=SQR(x*x+y*y):p=(d AND15)/32*10
0:c=7-((d DIV16)-(RND(100)<p)):GCOL0,(c
ANDc>=0):PLOT69,x*4,y*4:NEXT,
```



C PROGRAMMING

Listing 1 - DrawUtils+ (#includes only)
Listing 2 - MakeDat2 (creates new Diary and Template file)
Listing 3 - FontUtils+ (#includes only)
Listing 4 - Memory+ (update - new ensure_memory routine)
Listing 5 - Timely
Listing 6 - UserLib (new version)

Listing 1

```
/* Title:   >c.drawutils¶
*¶
* Purpose: Misc drawfile utils¶
*¶
* (C) Copyright D C Acton 1992¶
*¶
*/¶
¶
#include <stdlib.h>¶
#include <string.h>¶
#include <stdio.h>¶
#include <limits.h>¶
#include "memory.h"¶
#include "drawfobj.h"¶
#include "drawftypes.h"¶
#include "fontutils.h"¶
#include "font.h"¶
#include "flex.h"¶
#include "werr.h"¶
#include "macros.h"¶
¶
; rest as before...¶
¶
```

Listing 2

```
   10 REM >MakeDat2 (C2)
   20 REM Create Diary and Templates fil
es
   30 REM for 32-bit machines
   40 REM by Dave Acton
   50 REM (c) BAU July 1992
   60 :
   70 free%=(HIMEM-END-&8000) AND &FFFFF
000
   80 DIM w% free%
   90 REPEAT
  100 READ file$
  110 IF file$<>"*" THEN
  120 READ type%
  130 PRINT"Creating file """file$""" (t
ype &";~type%;")"
  140 IF type%=&FFF OR type%=&FEB THEN
  150 out%=OPENOUT(file$)
  160 REPEAT
  170 READ line$
  180 IF line$<>"*" BPUT#out%,line$
  190 UNTIL line$="*"
  200 CLOSE#out%
  210 ELSE
  220 READ olen%
  230 p%=0
  240 d$=""
  250 dl%=1
  260 WHILE p%<olen%
  270 b%=FNb
  280 IF b%=130:p%?w%=FNb:p%+=1
  290 IF b%>=131 AND b%<=162 THEN
  300 n%=b%-128
  310 f%=p%-FNb
  320 FOR i%=0 TO n%-1
  330 ?(w%+p%+i%)=?(w%+f%+i%)
  340 NEXT
  350 p%+=n%
  360 ENDIF
  370 IF b%<130 OR b%>162 THEN p%?w%=b%:
p%+=1
  380 ENDWHILE
  390 SYS "OS_File",0,file$,,,w%,w%+p%
  400 ENDIF
  410 SYS "OS_File",18,file$,type%
  420 ENDIF
  430 UNTIL file$="*"
  440 PRINT'"All files created okay"
  450 END
  460 :
  470 DEF FNb
  480 LOCAL b%,c1%,c2%,i%
  490 IF d$="" THEN
  500 READ d$,c1%
  510 c2%=0
  520 FOR i%=1 TO LEN(d$)/2
  530 c2%+=EVAL("&"+MID$(d$,2*i%-1,2))
  540 NEXT
  550 IF c1%<>(c2% MOD 100) PRINT"Error
in DATA line ";dl%:END
  560 dl%+=1
  570 ENDIF
  580 b%=EVAL("&"+LEFT$(d$,2))
  590 d$=MID$(d$,3)
  600 =b%
  610 :
  620 DATA "Diary",&FFF
  630 DATA "Timely"
  640 DATA "-1"
  650 DATA "1992 1993"
  660 DATA *
  670 DATA "Templates",&FEC
  680 DATA &B00
  690 DATA FFFFFFFF0000000830485,88
  700 DATA 07A4830D5F831101831554,95
  710 DATA 696D656C790D851F078311,76
  720 DATA 488315841878666 5725F73,27
  730 DATA 656E64831B5302000 05687,75
  740 DATA 186D61676E696669657283,1
  750 DATA 33AD030000A9873050726F,84
  760 DATA 67496E666F844A5A050000,0
  770 DATA E4048660456E74852C8480,94
  780 DATA 420A0000BE877871756572,66
  790 DATA 8777859B832F00C883A574,32
  800 DATA 8338D4835888B084BC837F,8
  810 DATA FF0702070003010C86C7FC,72
  820 DATA 83D0836484D43D84C582A0,94
  830 DATA 86CC84E458873488F18BE0,13
  840 DATA 4283FF3C83CB3883F8E483,40
  850 DATA D38C6352000082848363 01,25
  860 DATA 0C0E87198C6384BE308A63,32
  870 DATA 536176652061733A0D0D0D,40
  880 DATA 650783FBC083FF6083A8EE,1
  890 DATA 83FB829083B03D829001C7,98
  900 DATA 4F4B0D7469746C65643E0D,88
  910 DATA F61083F0B883C81683C8E4,29
  920 DATA 83D011610017848484DB1E,21
  930 DATA 83FF0A8740BA8840F10007,29
  940 DATA 43872084D84E83F5A683D4,45
  950 DATA 828E83FDEC83DC39834044,63
  960 DATA 87401083FE829A83FB0883,5
  970 DATA F44A83D8388480 6000D73C,52
  980 DATA 556E8880E64484CFFEFFFF,60
  990 DATA F483F32C93206E83F20C84,68
 1000 DATA 8C83E13C934046696C6520,83
 1010 DATA 6E616D6583F269636E0D83,48
 1020 DATA F300CE83CCD083D8DE0300,64
 1030 DATA 005083D884145483CC84D4,42
 1040 DATA 1200008284070207000 40D,13
 1050 DATA 8719FC83C80583FC83EC3D,59
 1060 DATA 83F88440860783B087E811,7
 1070 DATA 83FC0783E8488718828483,77
 1080 DATA F42883F811F300074283EC,63
 1090 DATA 4683F00483EC828C8738C8,73
 1100 DATA 8820F100074B83F84F8720,16
 1110 DATA 837C001483F03A83F484F8,59
 1120 DATA 3D200017828B0D89EC8520,36
 1130 DATA E883EC842018872082 8A8B,61
 1140 DATA 20D8874084A19440842084,48
 1150 DATA 4084C194407887D8829487,85
 1160 DATA C0010300D75487E40C83FB,52
 1170 DATA 4D61676E69666965720D39,84
 1180 DATA 39390D61302D398809390D,89
 1190 DATA 3A0D84FD8083FFF0020000,12
 1200 DATA FC8304C80387EF83FA8442,43
 1210 DATA 83DE828407020701 0C0E84,90
 1220 DATA 4C83FFFC838A0586733D83,29
 1230 DATA B2003085B9858478877613,1
 1240 DATA 83F20983F6A483543483FA,71
 1250 DATA 5483546483C23D3000B70D,29
 1260 DATA 4B0D88FAFE829A83FACC83,28
 1270 DATA DA76847C84206000075469,48
 1280 DATA 6D656C790D72640D490D84,97
 1290 DATA 2082988720C88440610007,81
 1300 DATA 828B87DA1A83F684408458,41
 1310 DATA 8440829487208298 87FA28,48
 1320 DATA 872030876060874 0A887A4,8
 1330 DATA 1E83F93E83FDD083E58488,92
 1340 DATA F883ED190000174E616D65,49
 1350 DATA 3A0D86A00E83F2829C8720,5
 1360 DATA C48720507572706F738323,78
 1370 DATA 83C084446887408290 8740,99
 1380 DATA 417574686F723A0D884038,54
 1390 DATA 87608480846056657273 69,40
 1400 DATA 6F6E854041626F75742074,73
 1410 DATA 6869732070726F6772616D,16
 1420 DATA 0D84FF206D616E61676572,63
 1430 DATA 0DA9204241552 04A756C79,82
 1440 DATA 20313939320D0D83F400C0,38
 1450 DATA 83F984C57C030000148304,91
 1460 DATA 8414841884F5120000F707,57
 1470 DATA 02070103010C85198294FE,16
 1480 DATA FFFFBC83FD84383D83F900,11
 1490 DATA 30000084078448380 48634,37
 1500 DATA 842A1F84C983EDC883ED82,4
 1510 DATA 8A835CF883F53D31000742,68
 1520 DATA 87242883E9FE837484203E,2
 1530 DATA 83508520829003C74F4B0D,19
 1540 DATA 7469746C6583ED7F4A8368,50
 1550 DATA 8440B68B2043616E63656C,31
 1560 DATA 0D8520 0683BD829083A5EC,10
 1570 DATA 83BCC08460F10007438784,21
 1580 DATA 849584208480608 3E58860,93
 1590 DATA 4C6173740D874082928780,55
 1600 DATA 844088804E657889202483,95
 1610 DATA E88460829083F0856083A0,25
 1620 DATA 44656C6574658A804C83F1,9
 1630 DATA 3A83FF828883F91BB102C7,95
 1640 DATA 4483E04583E40C83FC4083,41
 1650 DATA E45083F86883EC8084E060,38
 1660 DATA 008287200D6E89E0708720,60
 1670 DATA 2C83C0842011610 0C75787,66
 1680 DATA C0844084E0108760846884,59
 1690 DATA 605883E0598B6014876044,82
 1700 DATA 866082979060842084 6084,75
 1710 DATA 208460 6B8F60D4FE86C084,30
 1720 DATA 681BB122C76C83C06D8BC0,12
 1730 DATA D8832084C00886C0A790C0,40
 1740 DATA 842084C0842084C07F8FC0,38
 1750 DATA 82988760846884C08083E0,56
 1760 DATA 818BC0829C8760CC838883,79
 1770 DATA C0B790C0842084C0842084,95
 1780 DATA C082938BC07283D84C83F8,16
 1790 DATA A683E0828885C002C78294,91
 1800 DATA 83E0829587C0AE83F85083,25
 1810 DATA F8D683A08086C0C78CC0DE,60
 1820 DATA 8720829A02862084C0A78F,53
 1830 DATA 60108760846884C0A883E0,26
 1840 DATA A98B60148760448660D790,12
 1850 DATA 60842084608420 84C0BB8F,6
 1860 DATA C0D483F884C0846884C0BC,55
 1870 DATA 83E0BD8BC0D883F884C008,2
 1880 DATA 86C0E790C0842084C08420,45
 1890 DATA 84C0CF8FC0829887608468,15
 1900 DATA 84C0D083E0D18BC0829C87,48
 1910 DATA 60CC838883C0F790C08420,37
 1920 DATA 84C0842084C0E38BC04E65,49
 1930 DATA 7720656E7472790D0D0D0D,65
 1940 DATA 53726164696F6F66662C86,3
 1950 DATA 096E93149314A228A250A2,59
 1960 DATA 780D0D83EF007483F44483,6
 1970 DATA F4560300005883D4841484,48
 1980 DATA 18140700001200 03828407,41
 1990 DATA 0207010C0E84DA83DDFCFF,45
 2000 DATA FF0005862419843D300000,96
 2010 DATA 833B853554696D656C84F5,60
 2020 DATA 3E0D65834B00B2835DF6FE,84
 2030 DATA FFFFFA836526FFFFFF3D82,86
 2040 DATA 9001C75945530D69746C65,28
 2050 DATA 643E0DF606843F8318DE83,30
 2060 DATA 748357FF19010017B88391,98
 2070 DATA BA84958390E2839484402A,85
 2080 DATA 839488404E4F0D7488403F,28
 2090 DATA 0D6C34300D,34
 2100 DATA *
```

Listing 3

```
/* Title:   >c.fontutils¶
*¶
* Purpose: Misc font utils¶
*¶
* (C) Copyright D C Acton 1992¶
*¶
*/¶
¶
#include <stdlib.h>¶
#include <string.h>¶
#include <stdio.h>¶
#include "flex.h"¶
#include "werr.h"¶
#include "drawftypes.h"¶
#include "font.h"¶
#include "fontlist.h"¶
#include "menu.h"¶
#include "wimp.h"¶
#include "visdelay.h"¶
#include "macros.h"¶
#include "userlib.h"¶
¶
; rest as before...¶
¶
```

Listing 4

```
void ensure_memory(memory_block *b,int
 size)¶
{div_t d=div(size+b->extend-1,b->extend
);¶
size=d.quot*b->extend;¶
if (b->anchor==0) {if (size>0) {bool
ok;¶
if (b->flex)
{ok=(flex_alloc((flex_ptr)&b->anchor ,si
ze)!=0);¶
}¶
else {b->anchor=malloc(size) ;¶
ok=(b->anchor!=0);¶
}¶
if (!ok) {werr(1 ,"Out of memory");¶
}¶
}¶
}¶
else {if (size!=b->size) {if (size==0)
{if (b->flex)¶
flex_free((flex_ptr)&b->anchor);¶
else¶
free(b->anchor);¶
b->anchor=0;¶
}¶
else {bool ok;¶
if (b->flex)
{ok=(flex_extend((flex_ptr)&b->anchor ,s
ize)!=0);¶
}¶
else {b->anchor=realloc(b->anchor
,size);¶
ok=(b->anchor!=0);¶
}¶
if (!ok) {werr(1 ,"Can't extend - out of
memory")
;¶
}¶
}¶
b->size=size;¶
}¶
}¶
}
¶
```

Listing 5

```
/* Title:   >c.Timely¶
*¶
* Purpose: Time manager¶
*¶
* (C) BAU 1992¶
*¶
*/¶
¶
#include <stdlib.h>¶
#include <string.h>¶
#include <time.h>¶
#include <limits.h>¶
#include "wimp.h"¶
#include "wimpt.h"¶
#include "win.h"¶
#include "event.h"¶
#include "baricon.h"¶
#include "res.h"¶
#include "resspr.h"¶
#include "menu.h"¶
#include "template.h"¶
#include "dbox.h"¶
#include "dboxquery.h"¶
#include "werr.h"¶
#include "flex.h"¶
#include "coords.h"¶
#include "bbc.h"¶
#include "visdelay.h"¶
#include "os.h"¶
#include "saveas.h"¶
#include "xferrecv.h"¶
#include "drawferror.h"¶
#include "drawfobj.h"¶
#include "drawfdiag.h"¶
#include "drawftypes.h"¶
#include "font.h"¶
#include "magnify.h"¶
#include "wimputils.h"¶
#include "memory.h"¶
#include "drawutils.h"¶
#include "fontutils.h"¶
#include "userlib.h"¶
#include "macros.h"¶
¶
#define scl(i) viewer[i].zoom_mul/view
er[i].zoom_div¶
#define invscl(i) viewer[i].zoom_div/v
iewer[i].zoom_mul¶
#define tbord 64¶
#define lbord 64¶
#define rbord 8¶
#define bbord 8¶
#define draw_bord 140¶
#define id_enter  1¶
#define id_search 2¶
#define tml_qmenu_info     1¶
#define tml_qmenu_quit     3¶
#define timely_info_field 4¶
#define text_file_type 0xfff¶
#define draw_file_type 0xaff¶
#define timely_max_name_len 256¶
#define maxcol 13¶
#define maxrow 40¶
#define tasize sizeof(draw_textareastr
hdr)+sizeof(draw_textareastrend)+1¶
#define timely_maxwindows 64¶
¶
static char *timely_version_string="0.
03 (28 May 1992)";¶
static char temp_string[260],savetext[
256]="<Timely$Dir>.Diary",search[36]="*
";¶
static char *creator="Timely",*year_sp
ec[2]={19XX ,"19XX"};¶
static menu tml_qmenu,tml_cmenu,fmenu[
4];¶
static int ftrans[256],enter_tag=0,ent
er_where,viewer_to_save=-1;¶
static int first_year,last_year;¶
static enum {save_as_text ,save_as_draw
,save_whole,save_part} save_mode;¶
static time_t enter_time,ct[maxcol][ma
xrow];¶
static memory_block diary,tr_in,tr_out
;¶
static dbox enter_box;¶
static enum {entf_tm=0 ,entf_ok,entf_cn
c,entf_ms,entf_lst,entf_nxt,entf_del,en
tf_set};¶
typedef enum {never=-1 ,year,month,week
,day,hour} period;¶
static char *period_name[4]={year ,"m
onth","week","day"};¶
static enum {entry_new ,entry_ALTER,ent
ry_SEARCH} enter_mode;¶
static BOOL entry_on=FALSE,changed=FAL
SE,save_then_quit;¶
¶
static struct {int cellw,cellh;¶
period cellperiod,xperiod,yperiod;¶
char name[40],xlab[16],ylab[16],clab[1
6],save[12];¶
font_desc font[4];¶
} style[4];¶
¶
static struct {wimp_w hand;¶
int ref;¶
memory_block diag;¶
char name[40],save[12];¶
time_t start,end;¶
period type;¶
int sizex,sizey,zoom_mul,zoom_div;¶
} viewer[timely_maxwindows+1];¶
¶
typedef struct {draw_textareastrhdr
hdr;¶
draw_textareastrend end;¶
char string[1];¶
} draw_utils_text_area;¶
¶
typedef struct {int size;¶
```

```
time_t when;¶
int tag;¶
char message[1];¶
} diary_entry;¶
¶
typedef struct {int size;¶
time_t when;¶
int tag;¶
} diary_entry_hdr;¶
¶
static void timely_close_viewer(int i)
¶
{free_memory_block(&viewer[i].diag) ;¶
wimp_utils_close_window(viewer[i].ref)
;¶
viewer[i].hand=0;¶
}¶
¶
static int timely_entry(int i)¶
{diary_entry *d;¶
int j=0,off=0;¶
BOOL found=FALSE;¶
while (!found) {d=(diary_entry*)
(diary.anchor+off);¶
if (d->size!=0 && j<i) {=d->size ;¶
j++;¶
}¶
else found=TRUE;¶
}¶
return((d->size==0 || i!=j)?-1:off);¶
}¶
¶
static void refresh_entry()¶
{int i;¶
strftime(temp_string,256,style[day].na
me,localtime(&enter_time));¶
dbox_setfield(enter_box,entf_tm,temp_s
tring);¶
for (i=0;i<8;i++) dbox_setnumeric(ente
r_box,entf_set+3*i,i==enter_tag);¶
}¶
¶
static void fill_in_entry()¶
{if (enter_mode==entry_NEW)
{dbox_setfield(enter_box ,entf_ms,"");¶
dbox_fadefield(enter_box,entf_lst);¶
dbox_fadefield(enter_box,entf_nxt);¶
dbox_fadefield(enter_box,entf_del);¶
win_settitle(dbox_syshandle(enter_box)
,"New entry");¶
}¶
else {diary_entry *d=(diary_entry*)
(diary.a
nchor+timely_entry(enter_where));¶
enter_tag=d->tag;¶
enter_time=d->when;¶
dbox_setfield(enter_box,entf_ms,d->mes
sage);¶
dbox_unfadefield(enter_box,entf_lst);¶
dbox_unfadefield(enter_box,entf_nxt);¶
dbox_unfadefield(enter_box,entf_del);¶
win_settitle(dbox_syshandle(enter_box)
,(enter_mode=entry_SEARCH)?"Search":"Ed
it entry");¶
}¶
}¶
¶
static void open_entry()¶
{entry_on=true ;¶
fill_in_entry();¶
dbox_showstatic(enter_box);¶
refresh_entry();¶
}¶
¶
static void hide_entry()¶
{if (!entry_on) return;¶
dbox_hide(enter_box);¶
entry_on=FALSE;¶
}¶
¶
static void ensure_entry_valid()¶
{if (!entry_on) return;¶
if (timely_entry(enter_where)==-1) hid
e_entry();¶
else open_entry();¶
}¶
¶
static void skip_entry(int skip,BOOL r
eflect)¶
{int was=enter_where,try=enter_where,of
f=0;¶
while (enter_where==was && off!=-1)
{try+=skip ;¶
off=timely_entry(try);¶
if (off!=-1)¶
if (userlib_strcmp(search,((diary_entr
y*) (diary.anchor+off))->message)) ente
r_where=try;¶
}¶
if (enter_where!=was && reflect)
{fill_in_entry() ;¶
refresh_entry();¶
}¶
}¶
¶
static void timely_update_viewers()¶
{void timely_new(period,time_t,BOOL);¶
int i;¶
visdelay_begin();¶
for (i=0;i<timely_maxwindows;i++)¶
if (viewer[i].hand!=0) timely_new(view
er[i].type,viewer[i].start,FALSE);¶
visdelay_end();¶
}¶
¶
static void delete_current_entry(BOOL
update)¶
{int offset=timely_entry(enter_where);¶
diary_entry *d;¶
if (offset!=-1) {d=(diary_entry*)
(diary.anchor+offset)
;¶
memory_midextend(&diary,offset,-(d->si
ze));¶
if (update) timely_update_viewers();¶
changed=TRUE;¶
}¶
}¶
¶
static void timely_wipe(time_t from,ti
me_t to)¶
{int p1=-1,p2=-1,off=0;¶
diary_entry *d;¶
BOOL done=FALSE;¶
while (!done) {d=(diary_entry*)
(diary.anchor+off);¶
if (d->size==0) done=TRUE;¶
else {if (p1==-1 && difftime(d-
>when,from)>=
0) p1=off;¶
if (p2==-1 && difftime(d->when,to)>=0)
 p2=off;¶
off+=d->size;¶
}¶
}¶
if (p2==-1) p2=off;¶
if (p1!=-1) {memory_midextend(&diary
,p1,(p1-p2));¶
timely_update_viewers();¶
changed=TRUE;¶
}¶
}¶
¶
static int timely_steps(period type,ti
me_t start)¶
{struct tm *l=localtime(&start);¶
switch(type) {case year:¶
l->tm_year++;¶
return((int) difftime(mktime(l),start)
/(60*60*24));¶
case month:¶
l->tm_mon++;¶
return((int) difftime(mktime(l),start)
/(60*60*24));¶
case week:¶
return(7);¶
case day:¶
return(1);¶
}¶
return(0);¶
}¶
¶
static void timely_next(period type,st
ruct tm *l)¶
{if (type==day) l->tm_hour++;¶
else l->tm_mday++;¶
}¶
¶
static void timely_get_xyc(int *x,int
*y,draw_coltyp *c,struct tm *l,period t
ype)¶
{int temp;¶
time_t t=mktime(l);¶
switch(type) {case year:¶
*x=l->tm_mon;¶
l->tm_mday=1;¶
mktime(l);¶
*y=l->tm_wday;¶
l=localtime(&t);¶
*y+=l->tm_mday-1;¶
*c=(l->tm_wday % 6==0)?lightgrey:white
;¶
break;¶
case month:¶
temp=l->tm_mday-1+(l->tm_wday+36-l->tm
_mday) % 7;¶
*x=temp / 7;¶
*y=temp % 7;¶
*c=white;¶
break;¶
case week:¶
*x=0;¶
*y=l->tm_wday;¶
*c=white;¶
break;¶
case day:¶
*x=0;¶
*y=l->tm_hour;¶
*c=white;¶
break;¶
default:¶
break;¶
}¶
}¶
¶
static int timely_x(double x,period ty
pe)¶
{return((int)(lbord+style[type].cellw*x
));¶
}¶
¶
static int timely_y(double y,period ty
pe)¶
{return((int)(-tbord-style[type].cellh*
y));¶
}¶
¶
static void check_diag(draw_diag *diag
)¶
{draw_error dr_err;¶
if (!draw_verify_diag(diag,&dr_err))¶
werr(FALSE,"Bad diagram");
¶
}¶
¶
static void timely_main_redraw(int i,w
imp_redrawstr *r,BOOL *more)¶
{draw_error dr_err;¶
while (*more) {visdelay_begin() ;¶
if (!draw_render_diag((draw_diag*) &vi
ewer[i].diag,(draw_redrawstr*) r,(doubl
e) scl(i),&dr_err))¶
werr(TRUE,"Couldn't render diagram");¶
visdelay_end();¶
wimpt_noerr(wimp_get_rectangle(r,more)
);¶
}¶
}¶
¶
static void timely_redraw_window(int i
)¶
{bool more;¶
wimp_redrawstr r;¶
r.w=viewer[i].hand;¶
wimpt_noerr(wimp_redraw_wind(&r,&more)
);¶
timely_main_redraw(i,&r,&more);¶
}¶
¶
static void timely_save_line(char *s,F
ILE *f,memory_block *m)¶
{int len=strlen(s);¶
if (f!=0)¶
fputs(s,f);¶
else {ensure_extra_memory(m ,len+4);¶
strcpy((char*) m->anchor+m->used,s);¶
m->used+=len;¶
}¶
}¶
¶
static BOOL timely_saveit(FILE *f,memo
ry_block *m,int i)¶
{int j=0;¶
diary_entry *d;¶
BOOL done=FALSE,include;¶
struct tm *l;¶
char date[64];¶
if (f==0 && m==0) return(FALSE);¶
if (m!=0) m->used=0;¶
sprintf(temp_string,"%s\n%d\n%d %d\n",
creator,save_mode==save_whole?never:vie
wer[i].type,first_year,last_year);¶
timely_save_line(temp_string,f,m);¶
if (save_mode!=save_whole)
{l=localtime(&viewer[i].start) ;¶
sprintf(temp_string,"%d %d %d\n",l->tm
_year,l->tm_mon,l->tm_mday);¶
timely_save_line(temp_string,f,m);¶
}¶
do {d=(diary_entry*) (diary.anchor+j);¶
if (d->size==0)¶
done=TRUE;¶
else
{include=(save_mode==save_whole)?true:(
difftime(d->when,viewer[i].start)>=0 &&
 difftime(viewer[i].end,d->when)>0);¶
if (include) {l=localtime(&d->when) ;¶
strftime(date,256,"%d %b %y",l);¶
sprintf(temp_string,"%d %d %d %d (%s)\
n%s\n\n",l->tm_year,l->tm_mon,l->tm_mda
y,d->tag,date,d->message);¶
timely_save_line(temp_string,f,m);¶
}¶
j+=d->size;¶
}¶
} while (!done);¶
if (f!=0) fclose(f);¶
return(TRUE);¶
}¶
¶
static BOOL tml_sendproc(void *handle,
int *maxbuf)¶
{bool ok;¶
int i=(int) handle,to_send,length,pos=
0;¶
memory_block *m;¶
if (xfersend_file_is_safe() && save_mo
de==save_whole) changed=FALSE;¶
if (save_mode==save_as_draw) m=&viewer
[i].diag;¶
else {m=&tr_out ;¶
if (!timely_saveit(0,m,i)) return(FALS
E);¶
}¶
to_send=m->used;¶
while (to_send>0) {length=min(*maxbuf
,to_send);¶
if (!xfersend_sendbuf((char*) m->ancho
r+pos,length)) return FALSE;¶
else {pos+=length ;¶
to_send-=length;¶
}¶
}¶
if (save_mode!=save_as_draw) ensure_me
mory(m,0);¶
return(ok);¶
}¶
¶
static BOOL tml_saveproc(char *filenam
e,void *handle)¶
{bool ok;¶
os_filestr file;¶
int i=(int) handle;¶
if (strlen(filename) > timely_max_name
_len) {werr(false ,"Filename is too
long");¶
return(FALSE);¶
}¶
if (xfersend_file_is_safe() && save_mo
de==save_whole) changed=FALSE;¶
switch (save_mode) {case save_as_draw:¶
file.loadaddr=draw_file_type;¶
file.start=(int) viewer[i].diag.anchor
;¶
file.end=file.start+viewer[i].diag.use
d;¶
file.action=0x0a;¶
file.name=filename;¶
ok=(wimpt_complain(os_file(&file))==0)
;¶
break;¶
case save_part:¶
case save_whole:¶
ok=timely_saveit(fopen(filename,"w"),0
,i);¶
break;¶
default:¶
break;¶
}¶
return(ok);¶
}¶
¶
static void timely_click(wimp_mousestr
 *inf,int i)¶
{void timely_new(period,time_t,BOOL);¶
int mx,my,clickx,clicky,steps,cell,x,y
,c,offset;¶
struct tm *l;¶
BOOL found=FALSE,done=FALSE;¶
period pr,type=viewer[i].type;¶
wimp_wstate r;¶
diary_entry *d;¶
if ((inf->bbits & (wimp_BLEFT | wimp_B
RIGHT))!=0) {wimp_get_wind_state(inf->w
,&r);¶
mx=coords_x_toworkarea(inf->x,(coords_
cvtstr*) &r.o.box)*invscl(i)-lbord-draw
_bord;¶
my=viewer[i].sizey-coords_y_toworkarea
(inf->y,(coords_cvtstr*) &r.o.box)*invs
cl(i)-tbord+draw_bord;¶
clickx=mx/style[type].cellw;¶
clicky=my/style[type].cellh;¶
steps=timely_steps(type,viewer[i].star
t);¶
l=localtime(&viewer[i].start);¶
for (cell=0;cell<steps && !found;cell+
+) {timely_get_xyc(&x ,&y,&c,l,type);¶
if (x==clickx && y==clicky && mx>=0 &&
 my>=0) {pr=style[type].cellperiod ;¶
found=TRUE;¶
}¶
if (x==clickx && my<0 && !found)
{pr=style[type].xperiod ;¶
found=TRUE;¶
}¶
if (mx<0 && y==clicky && !found)
{pr=style[type].yperiod ;¶
found=TRUE;¶
}¶
if (found) {if ((pr==day && bbc_inkey(-
1)!=0) || v
iewer[i].type==day)
{enter_time=mktime(l) ;¶
if ((inf->bbits & wimp_BLEFT)!=0) ente
r_mode=entry_NEW;¶
else {enter_where=0 ;¶
offset=0;¶
do {d=(diary_entry*)
(diary.anchor+offset)
;¶
if (d->size==0) done=TRUE;¶
else {if (d->when==enter_time)
done=TRUE;¶
else {set+=d->size ;¶
enter_where++;¶
}¶
}¶
} while (!done);¶
enter_mode=(d->size==0)?entry_NEW:entr
y_ALTER;¶
}¶
search[1]=0;¶
open_entry();¶
}¶
else {if ((inf->bbits & wimp_BRIGHT)!=0)
tim
ely_close_viewer(i);¶
timely_new(pr,mktime(l),TRUE);¶
}¶
}¶
timely_next(type,l);¶
}¶
}¶
}¶
¶
static void timely_add_appointment(tim
e_t t,char *m,int k,BOOL update)¶
{diary_entry *d;¶
int i=0,req=(sizeof(diary_entry_hdr)+s
trlen(m)+4) & (~3);¶
BOOL found=FALSE;¶
do {d=(diary_entry*) (diary.anchor+i);¶
if (d->size==0)¶
found=TRUE;¶
else {found=(difftime(t ,d->when)<0);¶
if (!found)¶
i+=d->size;¶
}¶
} while (!found);¶
memory_midextend(&diary,i,req);¶
d=(diary_entry*) (diary.anchor+i);¶
d->size=req;¶
d->when=t;¶
d->tag=k;¶
strcpy(d->message,m);¶
diary.used+=req;¶
if (update) timely_update_viewers();¶
changed=TRUE;¶
}¶
¶
static void timely_enter_ok(BOOL persi
st)¶
{dbox_getfield(enter_box ,entf_ms,temp_s
tring,256);¶
if (enter_mode==entry_ALTER) delete_cu
```

```
rrent_entry(FALSE);¶
timely_add_appointment(enter_time,temp
_string,enter_tag,TRUE);¶
if (persist) hide_entry();¶
else ensure_entry_valid();¶
}¶
¶
static BOOL enter_event_handler(dbox d
,void *ev,void *handle)¶
{wimp_eventstr *e=(wimp_eventstr*) ev;¶
dbox_field field;¶
handle=handle;¶
d=d;¶
switch (e->e) {case wimp_ECLOSE:¶
hide_entry();¶
return(TRUE);¶
case wimp_EBUT:¶
field=e->data.but.m.i;¶
switch (field) {case entf_ok:¶
timely_enter_ok((e->data.but.m.bbits &
 wimp_BRIGHT)==0);¶
break;¶
case entf_cnc:¶
hide_entry();¶
break;¶
case entf_lst:¶
skip_entry(-1,TRUE);¶
break;¶
case entf_nxt:¶
skip_entry(1,TRUE);¶
break;¶
case entf_del:¶
delete_current_entry(TRUE);¶
if ((e->data.but.m.bbits & wimp_BRIGHT
)==0) hide_entry();¶
else ensure_entry_valid();¶
break;¶
default:¶
if (field>=entf_set) {enter_tag=(field-
entf_set)/3 ;¶
refresh_entry();¶
}¶
}¶
return(TRUE);¶
default:¶
break;¶
}¶
return(FALSE);¶
}¶
¶
static void timely_clear()¶
{ensure_memory(&diary ,4);¶
((diary_entry*) diary.anchor)->size=0;
¶
diary.used=4;¶
}¶
¶
static char* timely_load_line(char *s,
FILE *f,memory_block *m,int *p)¶
{char c,*t=s;¶
if (f!=0) return(fgets(s,*p,f));¶
else {char *r=(char *) m->anchor+*p;¶
do {c=*(r++) ;¶
*(t++)=c;¶
(*p)++;¶
} while (c>=' ');¶
}¶
return(s);¶
}¶
¶
static BOOL timely_loadit(FILE *f,memo
ry_block *m,int i)¶
{bool load_ok=FALSE;¶
char line[256];¶
int ld[9]={0 ,0,0},k,y1,y2,b=(f!=0)?256
:0;¶
time_t load_start;¶
period ltype,p=(i==-1)?never:viewer[i]
.type;¶
if (f==0 && m==0) return(FALSE);¶
sscanf(timely_load_line(line,f,m,&b),"
%s\n",temp_string);¶
if (strcmp(temp_string,creator)==0)
{sscanf(timely_load_line(line ,f,m,&b),"
%d\n",&ltype);¶
sscanf(timely_load_line(line,f,m,&b),"
%d %d\n",&y1,&y2);¶
if (ltype==never) {timely_clear() ;¶
first_year=y1;¶
last_year=y2;¶
}¶
else {sscanf(timely_load_line(line
,f,m,&b),"
%d %d %d\n",&ld[5],&ld[4],&ld[3]);¶
load_start=mktime((struct tm*) ld);¶
}¶
if (ltype==never || ltype==p)
{visdelay_begin() ;¶
while (!(f!=0?feof(f):b>=m->used)) {if
(timely_load_line(line,f,m,&b)==0)
break;¶
sscanf(line,"%d %d %d %d %[^\n]\n",&ld
[5],&ld[4],&ld[3],&k,temp_string);¶
sscanf(timely_load_line(line,f,m,&b),"
%[^\n]\n",temp_string);¶
timely_load_line(line,f,m,&b);¶
if (ltype!=never) ld[3]+=(int) difftim
e(viewer[i].start,load_start)/(60*60*24
);¶
timely_add_appointment(mktime((struct
tm*) ld),temp_string,k,FALSE);¶
}¶
visdelay_end();¶
timely_update_viewers();¶
load_ok=TRUE;¶
}¶
else {sprintf(temp_string ,"You can only
load
 a %s file onto a %s viewer",period_nam
e[ltype],period_name[ltype]);¶
werr(FALSE,temp_string);¶
}¶
}¶
else werr(FALSE,"That's not a Timely f
ile");¶
if (f!=0) fclose(f);¶
if (ltype==never) changed=FALSE;¶
return(load_ok);¶
}¶
¶
static BOOL timely_main_load(int filet
ype,char *filename,int i)¶
{bool load_ok=FALSE;¶
if (strlen(filename)>timely_max_name_l
en)¶
werr(FALSE,"File name is too long");¶
else {if (filetype==text_file_type)
load_ok=
timely_loadit(fopen(filename,"r"),0,i);
¶
}¶
return(load_ok);¶
}¶
¶
¶
static void timely_loadproc(int i)¶
{char *filename;¶
int filetype=xferrecv_checkinsert(&fil
ename);¶
if (timely_main_load(filetype,filename
,i)) xferrecv_insertfileok();¶
}¶
¶
static BOOL timely_ram_loader(char **b
uffer,int *size)¶
{if (viewer_to_save==-2) {werr(false
,"You cannot save the whole
diary to itself");¶
return(FALSE);¶
}¶
tr_in.used+=*size;¶
ensure_extra_memory(&tr_in,0x1000);¶
*buffer+=*size;¶
*size=0x1000;¶
return(TRUE);¶
}¶
¶
static void timely_ramload(int i)¶
{int estsize,final_size;¶
int filetype=xferrecv_checkimport(&est
size);¶
if (filetype!=-1) {if
(filetype==text_file_type) {tr_in.used=0
;¶
ensure_memory(&tr_in,estsize);¶
final_size=xferrecv_doimport(tr_in.anc
hor,estsize,timely_ram_loader);¶
if (final_size>=0)
{tr_in.used+=final_size ;¶
timely_loadit(0,&tr_in,i);¶
free_memory_block(&tr_in);¶
}¶
}¶
}¶
else timely_loadproc(i);¶
}¶
¶
¶
static void viewer_event_handler(wimp_
eventstr *e,void *handle)¶
{int i=(int) handle;¶
switch (e->e) {case wimp_EREDRAW:¶
timely_redraw_window(i);¶
break;¶
case wimp_EOPEN:¶
wimp_utils_open_window(&e->data.o);¶
break;¶
case wimp_ECLOSE:¶
timely_close_viewer(i);¶
break;¶
case wimp_EBUT:¶
timely_click(&e->data.but.m,i);¶
break;¶
case wimp_ESEND:¶
case wimp_ESENDWANTACK:¶
switch(e->data.msg.hdr.action) {case
wimp_MDATASAVE:¶
timely_ramload(i);¶
break;¶
case wimp_MDATALOAD:¶
case wimp_MDATAOPEN:¶
timely_loadproc(i);¶
break;¶
default:¶
break;¶
}¶
default:¶
break;¶
}¶
}¶
¶
static menu tml_menumaker(void *handle
)¶
{int i=(int) handle,j;¶
period type=viewer[i].type;¶
menu m1,m2,m4;¶
char *mname[4]={X labels ,"Y labels",
"Cell","Entry"};¶
if (!event_is_menu_being_recreated())
{m1=menu_new("save" ,">Drawfile,>Text");
¶
m2=menu_new("Search","0123456789");¶
menu_make_writeable(m2,1,&search[1],32
,"");¶
m4=menu_new("Style","X labels,Y labels
,Cell,Entry");¶
tml_cmenu=menu_new(viewer[i].save,"Sav
e,Search,>Zoom,Style,Clear");¶
for (j=0;j<4;j++)
{fmenu[j]=font_utils_menu(mname[j] ,&sty
le[type].font[j]);¶
menu_submenu(m4,j+1,fmenu[j]);¶
}¶
search[1]=0;¶
menu_submenu(tml_cmenu,1,m1);¶
menu_submenu(tml_cmenu,2,m2);¶
menu_submenu(tml_cmenu,4,m4);¶
}¶
for (j=0;j<4;j++) font_utils_tickmenu(
fmenu[j],&style[type].font[j]);¶
return(tml_cmenu);¶
}¶
¶
static menu tml_qmenumaker(void *handl
e)¶
{menu m1,m2,m3,m4,m5;¶
char *s;¶
int y;¶
handle=handle;¶
if (!event_is_menu_being_recreated())
{s=temp_string ;¶
for (y=first_year;y<=last_year;y++)¶
s+=sprintf(s,",%d",y);¶
m1=menu_new("Year",&temp_string[1]);¶
m2=menu_new("First year","X");¶
menu_make_writeable(m2,1,year_spec[0],
5,"a0-9");¶
m3=menu_new("Last year","X");¶
menu_make_writeable(m3,1,year_spec[1],
5,"a0-9");¶
sprintf(year_spec[0],"%d",first_year);
¶
sprintf(year_spec[1],"%d",last_year);¶
m4=menu_new("Range","First year,Last y
ear");¶
m5=menu_new("Options","Save,Load");¶
tml_qmenu=menu_new("Timely",">Info,>Sa
ve,Open,Range,Options,Quit");¶
menu_submenu(m4,1,m2);¶
menu_submenu(m4,2,m3);¶
menu_submenu(tml_qmenu,3,m1);¶
menu_submenu(tml_qmenu,4,m4);¶
menu_submenu(tml_qmenu,5,m5);¶
}¶
return(tml_qmenu);¶
}¶
¶
static void zoom_proc(void *handle)¶
{int i=(int) handle;¶
wimp_redrawstr r;¶
wimp_wstate w;¶
r.w=viewer[i].hand;¶
r.box.x0=draw_bord*scl(i);¶
r.box.y0=draw_bord*scl(i);¶
r.box.x1=(draw_bord+viewer[i].sizex)*s
cl(i);¶
r.box.y1=(draw_bord+viewer[i].sizey)*s
cl(i);¶
wimpt_noerr(wimp_set_extent(&r));¶
wimpt_noerr(wimp_get_wind_state(viewer
[i].hand,&w));¶
wimpt_noerr(wimp_close_wind(viewer[i].
hand));¶
wimpt_noerr(wimp_open_wind(&w.o));¶
}¶
¶
static void tml_menu_proc(void *handle
,char *hit)¶
{int i=(int) handle;¶
save_then_quit=FALSE;¶
switch (hit[0]) {case 1:¶
switch (hit[1]) {case 1:¶
save_mode=save_as_draw;¶
saveas(draw_file_type,viewer[i].save,v
iewer[i].diag.used,tml_saveproc,tml_sen
dproc,0,(void*) i);¶
break;¶
case 2:¶
viewer_to_save=i;¶
save_mode=save_part;¶
saveas(text_file_type,viewer[i].save,0
x1000,tml_saveproc,tml_sendproc,0,(void
*) i);¶
break;¶
default:¶
break;¶
}¶
break;¶
case 2:¶
if (hit[1]==1) {strcat(search ,"*");¶
enter_mode=entry_SEARCH;¶
enter_where=-1;¶
skip_entry(1,FALSE);¶
if (enter_where==-1) werr(0,"Not found
");¶
else open_entry();¶
}¶
break;¶
case 3:¶
magnify_select(&viewer[i].zoom_mul,&vi
ewer[i].zoom_div,8,8,zoom_proc,handle);
¶
break;¶
case 4:¶
if (hit[1]>0) {font
_utils_menu_select(&hit[2],&style[
viewer[i].type].font[hit[1]-1]);¶
timely_update_viewers();¶
}¶
break;¶
case 5:¶
timely_wipe(viewer[i].start,viewer[i].
end);¶
break;¶
default:¶
break;¶
}¶
viewer_to_save=-1;¶
}¶
¶
static BOOL valid_cell(int x,int y)¶
{if (x<0 || x>=maxcol || y<0 || y>=maxr
ow) return (FALSE);¶
return(ct[x][y]!=(time_t)-1);¶
}¶
¶
void wimp_utils_forceredraw(int i)¶
{wimp_wstate wst;¶
if (winfo[i].is_open)
{wimp_get_wind_state(winfo[i].hand ,&wst
);¶
wimp_close_wind(winfo[i].hand);¶
wimp_open_wind(&wst.o);¶
}¶
}¶
¶
static void timely_insert_detail(char
*ent,int *cx,int *cy,int ex0,int ey0,in
t ex1,draw_coltyp fore,draw_coltyp back
,int fh,period type,memory_block *m)¶
{int splitchar=' ';¶
font_string entry_string;¶
char tempc;¶
draw_object dummy;¶
while (*cy>=ey0 && ent[0]>' ')
{entry_string.s=ent ;¶
entry_string.x=screen_to_mpts(ex1-*cx)
;¶
entry_string.y=1000000;¶
entry_string.split=splitchar;¶
entry_string.term=strlen(ent);¶
wimpt_noerr(font_strwidth(&entry_strin
g));¶
if (entry_string.term>0) {splitchar='
';¶
tempc=ent[entry_string.term];¶
ent[entry_string.term]=0;¶
add_text_box(ent,draw_screenToDraw(*cx
),draw_screenToDraw(*cy),draw_screenToD
raw(ex1-*cx),draw_screenToDraw(*cy+fh),
draw_ljust,draw_tjust,&style[type].font
[3],fore,back,&dummy,m);¶
if (entry_string.split>0 && ent[entry_
string.term]>0) {*cy-=fh ;¶
*cx=ex0;¶
}¶
else *cx+=mpts_to_screen(entry_string.
x);¶
ent[entry_string.term]=tempc;¶
ent=&ent[entry_string.term];¶
while (ent[0]==' ') ent++;¶
}¶
else {if (*cx>ex0) {*cy-=fh ;¶
*cx=ex0;¶
}¶
else splitchar=-1;¶
}¶
}¶
}¶
¶
static void timely_new(period type,tim
e_t start,BOOL tofront)¶
{char temp[256];¶
int new=0,steps,cell,i,x,y,pass,ex0,ey
0,ex1,ey1,cx,cy;¶
int row0=INT_MAX,row1=INT_MIN,col0=INT
_MAX,col1=INT_MIN;¶
draw_coltyp colour;¶
draw_box bx;¶
struct tm *l;¶
draw_object dummy;¶
wimp_wind *window;¶
BOOL exists=FALSE,found;¶
diary_entry *d;¶
font_info entry_font;¶
wimp_palettestr pal;¶
wimp_readpalette(&pal);¶
if (type==never || type==hour) return;
¶
if (type==week) {l=localtime(&start) ;¶
while (l->tm_wday!=0) {l->tm_mday-- ;¶
start=mktime(l);¶
}¶
}¶
while (new<timely_maxwindows && !exist
s) {if (viewer[new].hand!=0 &&
viewer[new]
.type==type && viewer[new].start==start
) exists=TRUE;¶
else new++;¶
}¶
if (!exists)
{window=template_syshandle("timely") ;¶
new=0;¶
while (new<timely_maxwindows && viewer
[new].hand!=0) new++;¶
if (new==timely_maxwindows) {werr(false
,"Too many viewers");¶
return;¶
}¶
}¶
for (x=0;x<maxcol;x++)¶
for (y=0;y<maxrow;y++)¶
ct[x][y]=(time_t)-1;¶
strftime(viewer[new].name,40,style[typ
e].name,localtime(&start));¶
strftime(viewer[new].save,12,style[typ
e].save,localtime(&start));¶
viewer[new].start=start;¶
l=localtime(&start);¶
switch (type) {case day:¶
l->tm_mday++;¶
break;¶
case week:¶
l->tm_mday+=7;¶
break;¶
```

```
case month:¶
l->tm_mon++;¶
break;¶
case year:¶
l->tm_year++;¶
break;¶
}¶
viewer[new].end=mktime(l);¶
ensure_memory(&viewer[new].diag,1024);
¶
if (type==month || type==year) font_ch
arbbox(style[type].font[3].handle,'*',f
ont_OSCOORDS,&entry_font);¶
else font_readinfo(style[type].font[3]
.handle,&entry_font);¶
for (pass=0;pass<2;pass++) {if (pass==1)
{draw_create_diag((draw_diag*) &viewer[
new].diag,creator,bx);¶
draw_utils_begin_font_list();¶
for (x=0;x<4;x++) add_font_to_list(&st
yle[type].font[x]);¶
add_draw_object(&viewer[new].diag,&dum
my,draw_FirstObject,TRUE);¶
}¶
steps=timely_steps(type,start);¶
l=localtime(&start);¶
i=0;¶
for (cell=0;cell<steps;cell++)
{timely_get_xyc(&x ,&y,&colour,l,type);¶
ct[x][y]=mktime(l);¶
row0=min(row0,y);¶
row1=max(row1,y);¶
col0=min(col0,x);¶
col1=max(col1,x);¶
if (pass==1) {found=false ;¶
ex0=timely_x(x,type);¶
if (style[type].clab[0]>=' ') {font
_setfont(style[type].font[2].handl
e);¶
ex0+=48; /* calculate this! */¶
}¶
ex1=timely_x((double) x+1,type);¶
ey0=timely_y((double) y+1,type);¶
ey1=timely_y(y,type);¶
cx=ex0;¶
cy=ey1-(entry_font.maxy-entry_font.min
y);¶
font_setfont(style[type].font[3].handl
e);¶
do {d=(diary_entry*) (diary.anchor+i);¶
if (d->size==0) found=TRUE;¶
else {if (difftime(d->when,ct[x][y])>=0)
{if (difftime(d->when,ct[x][y])==0) {int
*pp=(int *) &pal.c[8+d->tag].bytes
;¶
d=(diary_entry*) (diary.anchor+i);¶
if (type==day && cx>ex0) {cy-
=entry_font.maxy-entry_font.miny ;¶
cx=ex0;¶
}¶
timely_insert_detail("* ",&cx,&cy,ex0,
ey0,ex1,*pp,colour,entry_font.maxy-entr
y_font.miny,type,&viewer[new].diag);¶
if (type==day || type==week)¶
timely_insert_detail(d->message,&cx,&c
y,ex0,ey0,ex1,black,colour,entry_font.m
axy-entry_font.miny,type,&viewer[new].d
iag);¶
i+=((diary_entry*) (diary.anchor+i))->
size;¶
}¶
else found=TRUE;¶
}¶
else i+=d->size;¶
}¶
} while (!found);¶
if (style[type].clab[0]>=' ')
{strftime(temp ,32,style[type].clab,l);¶
add_text_box(temp,draw_screenToDraw(ti
mely_x(x,type)),draw_screenToDraw(timel
y_y((double) y+0.25,type)),draw_screenT
oDraw(timely_x((double) x+1,type)),draw
_screenToDraw(timely_y(y,type)),draw_lj
ust,draw_tjust,&style[type].font[2],bla
ck,colour,&dummy,&viewer[new].diag);¶
}¶
}¶
timely_next(type,l);¶
}¶
viewer[new].sizex=lbord+rbord+style[ty
pe].cellw*(col1-col0+1);¶
viewer[new].sizey=tbord+bbord+style[ty
pe].cellh*(row1-row0+1);¶
bx.x0=0;¶
bx.y1=0;¶
bx.y0=-draw_screenToDraw(viewer[new].s
izey);¶
bx.x1=draw_screenToDraw(viewer[new].si
zex);¶
if (!exists) {viewer[new].zoom_mul=1 ;¶
viewer[new].zoom_div=1;¶
}¶
}
¶
begin_path_obj(0x42,0x10,0x20,black);¶
for (y=0;y<maxrow;y++) {x=0 ;¶
while (x<=maxcol) {while (x<=maxcol &&
!valid_cell(x,y) &
& !valid_cell(x,y-1)) x++;¶
if (x<=maxcol)
{add_move_to_path_obj(timely_x(x ,type),
timely_y(y,type));¶
while (valid_cell(x,y) || valid_cell(x
,y-1)) x++;¶
add_line_to_path_obj(timely_x(x,type),
timely_y(y,type));¶
}¶
}¶
}¶
for (x=0;x<maxcol;x++) {y=0 ;¶
while (y<=maxrow) {while (y<=maxrow &&
!valid_cell(x,y) &
& !valid_cell(x-1,y)) y++;¶
if (y<=maxrow)
{add_move_to_path_obj(timely_x(x ,type),
timely_y(y,type));¶
while (valid_cell(x,y) || valid_cell(x
-1,y)) y++;¶
add_line_to_path_obj(timely_x(x,type),
timely_y(y,type));¶
}¶
}¶
}¶
end_path_obj();¶
add_draw_object(&viewer[new].diag,&dum
my,draw_LastObject,TRUE);¶
for (y=row0;y<=row1;y++) {x=col0 ;¶
while (ct[x][y]==(time_t)-1) x++;¶
strftime(temp,32,style[type].ylab,loca
ltime(&ct[x][y]));¶
add_text_box(temp,0,draw_screenToDraw(
-64-style[type].cellh*(y+1)),draw_scree
nToDraw(lbord*7/8),draw_screenToDraw(-6
4-style[type].cellh*y),draw_rjust,draw_
middle,&style[type].font[1],black,white
,&dummy,&viewer[new].diag);¶
}¶
for (x=col0;x<=col1;x++) {y=row0 ;¶
while (ct[x][y]==(time_t)-1) y++;¶
strftime(temp,32,style[type].xlab,loca
ltime(&ct[x][y]));¶
add_text_box(temp,draw_screenToDraw(lb
ord+style[type].cellw*x),draw_screenToD
raw(-tbord*3/4),draw_screenToDraw(lbord
+style[type].cellw*(x+1)),0,draw_centre
,draw_bjust,&style[type].font[0],black,
white,&dummy,&viewer[new].diag);¶
}¶
draw_shift_diag((draw_diag*) &viewer[n
ew].diag,draw_screenToDraw(draw_bord),d
raw_screenToDraw(draw_bord+viewer[new].
sizey));¶
check_diag((draw_diag*) &viewer[new].d
iag);¶
if (!exists) {window->titleflags=window-
>titleflags | wimp_INDIRECT;¶
window->title.indirecttext.buffer=view
er[new].name;¶
window->title.indirecttext.validstring
=0;¶
window->title.indirecttext.bufflen=20;
¶
window->ex.x0=draw_bord*scl(new);¶
window->ex.y1=(draw_bord+viewer[new].s
izey)*scl(new);¶
window->ex.x1=(draw_bord+viewer[new].s
izex)*scl(new);¶
window->ex.y0=draw_bord*scl(new);¶
window->box=window->ex;¶
window->scx=0;¶
window->scy=0;¶
viewer[new].ref=wimp_utils_create_wind
ow("Timely",new,TRUE);¶
viewer[new].hand=winfo[viewer[new].ref
].hand;¶
viewer[new].type=type;¶
win_register_event_handler(viewer[new]
.hand,viewer_event_handler,(void*)new);
¶
event_attachmenumaker(viewer[new].hand
,tml_menumaker,tml_menu_proc,(void*)new
);¶
}¶
if (tofront) wimp_utils_front(viewer[n
ew].ref,in_centre,0,0);¶
else wimp_utils_forceredraw(viewer[new
].ref);¶
}¶
¶
static time_t year_start(int y)¶
{int i,ld[9];¶
for (i=0;i<9;i++) ld[i]=0;¶
ld[3]=1;¶
ld[5]=y-1900;¶
return(mktime((struct tm*) ld));¶
}¶
¶
static int timely_current_year()¶
{time_t t;¶
time(&t);¶
return(1900+localtime(&t)->tm_year);¶
}¶
¶
static void timely_iconclick(wimp_i ic
on)¶
{icon=icon ;¶
timely_new(year,year_start(timely_curr
ent_year()),TRUE);¶
}¶
¶
static void timely_info_about_program(
void)¶
{dbox d;¶
if (d=dbox_new("ProgInfo"),d!=NULL)
{dbox_setfield(d ,timely_info_field,time
ly_version_string);¶
dbox_show(d);¶
dbox_fillin(d);¶
dbox_dispose(&d);¶
}¶
}¶
¶
static void timely_load_options()¶
{int i,j;¶
double a,b;¶
FILE *in=res_openfile("!Config","r");¶
if (in==0) werr(1,"Can't find !Config"
);¶
for (i=0;i<=3;i++) {fscanf(in ,"%d %d %d
%d %d\n%[^,],%[^,]
,%[^,],%[^,],%[^\n]\n",&style[i].cellw,
&style[i].cellh,&style[i].cellperiod,&s
tyle[i].xperiod,&style[i].yperiod,style
[i].name,style[i].ylab,style[i].xlab,st
yle[i].clab,style[i].save);¶
for (j=0;j<4;j++) {fscanf(in ,"%s %lf
%lf\n",temp_string,&
a,&b);¶
font_utils_declarefont(&style[i].font[
j],temp_string,a,b);¶
}¶
}¶
for (i=0;i<8;i++) {fscanf(in
,"%s\n",temp_string);¶
dbox_setfield(enter_box,entf_set+2+3*i
,temp_string);¶
}¶
fclose(in);¶
}¶
¶
static void timely_save_options()¶
{int i,j;¶
FILE *out=res_openfile("!config","w");
¶
for (i=0;i<=3;i++) {fprintf(out ,"%d %d
%d %d %d\n%s,%s,%s,
%s,%s\n",style[i].cellw,style[i].cellh,
style[i].cellperiod,style[i].xperiod,st
yle[i].yperiod,style[i].name,style[i].y
lab,style[i].xlab,style[i].clab,style[i
].save);¶
for (j=0;j<4;j++) fprintf(out,"%s %lf
%lf\n",style[i].font[j].name,style[i].f
ont[j].xpt,style[i].font[j].ypt);¶
}¶
for (i=0;i<8;i++)
{dbox_getfield(enter_box ,entf_set+2+3*i
,temp_string,256);¶
fprintf(out,"%s\n",temp_string);¶
}¶
fclose(out);¶
}¶
¶
static void timely_save_all()¶
{viewer_to_save=-2 ;¶
save_mode=save_whole;¶
saveas(text_file_type,savetext,0,tml_s
aveproc,tml_sendproc,0,0);¶
viewer_to_save=-1;¶
if (save_then_quit) exit(0);¶
}¶
¶
static void timely_quit()¶
{if (changed) {switch (dboxquery("Do you
want to save
 your altered diary?")) {case
dboxquery_YES:¶
save_then_quit=TRUE;¶
timely_save_all();¶
break;¶
case dboxquery_NO:¶
exit(0);¶
case dboxquery_CANCEL:¶
break;¶
}¶
}¶
else exit(0);¶
}¶
¶
static void tml_qmenu_proc(void *handl
e,char *hit)¶
{int i,y;¶
handle=handle;¶
save_then_quit=FALSE;¶
switch (hit[0]) {case 1:¶
timely_info_about_program();¶
break;¶
case 2:¶
timely_save_all();¶
break;¶
case 3:¶
if (hit[1]>0) timely_new(year,year_sta
rt(first_year+hit[1]-1),TRUE);¶
break;¶
case 4:¶
if (hit[1]>0) {if (hit[2]>0)
{y=atoi(year_spec[hit[1]-1]) ;¶
if (y>=1970 && y<2047) {if (hit[1]==1)
{int new=min(timely_current_year(),y);¶
if (new>first_year) timely_wipe(year_s
tart(first_year),year_start(new));¶
first_year=new;¶
}¶
else {int
new=max(timely_current_year(),y);¶
if (new<last_year) timely_wipe(year_st
art(new),year_start(last_year+1));¶
last_year=new;¶
}¶
for (i=0;i<timely_maxwindows;i++) {if
(viewer[i].hand!=0)¶
if (difftime(year_start(first_year),vi
ewer[i].start)>0 || difftime(viewer[i].
end,year_start(last_year+1))>0) timely_
close_viewer(i);¶
}¶
ensure_entry_valid();¶
}¶
else werr(FALSE,"Bad year");¶
}¶
}¶
break;¶
case 5:¶
switch(hit[1]) {case 1:¶
timely_save_options();¶
break;¶
case 2:¶
timely_load_options();¶
timely_update_viewers();¶
break;¶
default:¶
break;¶
}¶
break;¶
case 6:¶
timely_quit();¶
break;¶
}¶
}¶
¶
static void timely_init()¶
{int i;¶
for (i=0;i<timely_maxwindows;i++)
{init_memory_block(&viewer[i].diag ,0x10
0,TRUE);¶
viewer[i].hand=0;¶
}¶
timely_load_options();¶
init_memory_block(&diary,256,TRUE);¶
init_memory_block(&tr_in,0x1000,TRUE);
¶
init_memory_block(&tr_out,0x1000,TRUE)
;¶
timely_clear();¶
first_year=timely_current_year();¶
last_year=first_year;¶
}¶
¶
static BOOL timely_initialise(void)¶
{wimpt_init("timely") ;¶
res_init("Timely");¶
resspr_init();¶
flex_init();¶
template_init();¶
dbox_init();¶
visdelay_init();¶
drawfobj_init();¶
drawfdiag_init();¶
draw_transTable=ftrans;¶
draw_utils_init();¶
wimp_utils_init();¶
font_utils_init();¶
enter_box=dbox_new("Enter");¶
dbox_raw_eventhandler(enter_box,enter_
event_handler,(void*) id_enter);¶
timely_init();¶
baricon("!timely",(int)resspr_area(),t
imely_iconclick);¶
win_register_event_handler(win_ICONBAR
LOAD,viewer_event_handler,(void*)-1);¶
event_attachmenumaker(win_ICONBAR,tml_
qmenumaker,tml_qmenu_proc,(void*)-1);¶
return(TRUE);¶
}¶
¶
int main(int argc,char *argv[])¶
{if (timely_initialise()) {if
(!timely_main_load(text_file_type,"
<Timely$Dir>.Diary",-1))¶
werr(FALSE,"Can't load default diary")
;¶
while (TRUE) event_process();¶
}¶
return(0);¶
}¶
```

Listing 6

```
/* Title:   >c.userlib¶
*¶
* Purpose: Misc routines¶
*¶
* (C) Copyright D C Acton 1992¶
*¶
*/¶
¶
#include "macros.h"
¶
#include <stdlib.h>¶
#include <string.h>¶
¶
int userlib_lc(char a,BOOL any)¶
{return((a>='a' && a<='Z' && any)?a+'a'
-'A':a);¶
}¶
¶
int userlib_genstrcmp(char *s1,char *s
2,BOOL any)¶
{char c1=userlib_lc(*s1,any),c2=userlib
_lc(*s2,any);¶
if (c2==0) {while (*s1=='*') s1++;¶
return(*s1==0);¶
}¶
if (c1==c2 || c1=='#') return(userlib_
genstrcmp(&s1[1],&s2[1],any));¶
if (c1=='*') {bool ok=FALSE;¶
if (s1[1]==0) return(TRUE);¶
while (!ok && *s2!=0) {ok=ok ||
userlib_genstrcmp(&s1[1],s2,a
ny);¶
s2++;¶
}¶
return(ok);¶
}¶
return(FALSE);¶
}¶
¶
int userlib_strcmp(char *s1,char *s2)¶
{return(userlib_genstrcmp(s1 ,s2,TRUE));
¶
}
```



PIECES OF EIGHT

Listing 1

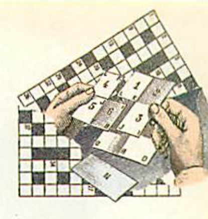
```
   10 REM >Hemera Diary (Po81)
   20 REM by Rupert Thompson
   30 REM for B/B+/M/C/A
   40 REM (c) BAU January 1990
   50 REM and BAU August 1992
   60 :
   70 MODE 7:PROCsetup:PROCvar
   80 ON ERROR PROCerror
   90 VDU 3,6
  100 end%=0:REPEAT:PROCmenu:UNTIL end%
  110 PROCclose:MODE 7:*FX 4
  120 END
  130 :
  140 DEF PROCsetup:PROCdh(0,134,0,"Hemera Desk Diary")
  150 PRINTTAB(0,2);CHR$149;STRING$(39,CHR$163);TAB(0,23);CHR$149;STRING$(39,CHR$172);CHR$133;"ESCAPE returns to Options Menu";
  160 VDU 28,0,22,39,3
  170 *FX 4,1
  180 ENDPROC
  190 :
  200 DEF PROCvar
  210 DIM record$(11),os 40,title$(11),width%(11),val$(11),nu(11)
  220 open%=0:f$=":0.$.":c$=CHR$&8A+CHR$&8B+CHR$&7F+CHR$9+CHR$&87+CHR$13:CD%=1:fu=-1:vi=-1:cf$="A":ser$=""
  230 ENDPROC
  240 :
  250 DEF PROCmenu:CLS:PROCdh(0,133,0,"Options Menu"):PRINT'" ";CHR$133;:IF open% THEN PRINT"Editing ";f$' ELSE PRINT"Editing no file"'
  260 RESTORE 420:READ o$:REPEAT:PRINT;" ";CHR$134;o$:READ o$:UNTIL o$="*":PRINT:PRINTCHR$134;" *  - Operating System Command"''CHR$133;"Please select the option you require";
  270 *FX 225,240
  280 REPEAT:G=GET:UNTIL G>239 AND G<250 OR G=42
  290 PRINT:*FX 225,1
  300 IF G=42 THEN PROCstar
  310 IF G=240 THEN PROCopen
  320 IF G=241 THEN PROCscan
  330 IF G=242 THEN PROCautocal
  340 IF G=243 THEN PROCgtd
  350 IF G=244 THEN PROCinterr
  360 IF G=245 THEN PROCcreate
  370 IF G=246 THEN PROCprint
  380 IF G=247 THEN PROChelp
  390 IF G=248 THEN end%=FNsure("Exit program.")
  400 ENDPROC
  410 :
  420 DATA f0 - Open Diary File,f1 - Scan/Edit Diary,f2 - Auto-Insert Calendrical Data,f3 - Go to Day,f4 - Interrogate Diary,f5 - Create New Diary File,f6 - Print Diary,f7 - Help Screen,f8 - Exit Program HEMERA,*
  430 :
  440 DEF PROCerror:IF ERR=17 THEN ENDPROC
  450 CLS:VDU 7:PROCdh(5,133,1,"ERROR!"):PRINTTAB(0,8);CHR$134;"The following error has occurred:":REPORT:PROCdh(12,133,0,"Press any key to continue"):G=GET:ENDPROC
  460 :
  470 DEF FNsure(o$):VDU 7:PRINT'CHR$133;o$;" Are you sure? (Y/N)";:REPEAT:G$=GET$:UNTIL INSTR("YyNn",G$)>0:=INSTR("Yy",G$)>0
  480 :
  490 DEF PROCclose:CLOSE# 0:open%=0:f$="":ENDPROC
  500 :
  510 DEF PROCopfi(o$):PROCclose:F=OPENUP o$:IF F=0 THENPROCerr("File not found!"):ENDPROC
  520 PTR# F=0:INPUT# F,rec,recn,recs,f:PTR# F=255:INPUT# F,record$(0):Yr%=VALrecord$(0):f$=o$:open%=-1:CD%=1:ENDPROC
  530 :
  540 DEF PROCstar:PRINT'CHR$134;:INPUT"*"o$
  550 PROCoscli(o$):PRINT'CHR$133;"Press any key to continue";:G=GET
  560 IF G=42 THEN PROCstar
  570 ENDPROC
  580 :
  590 DEF PROCoscli(o$):$os=o$
  600 X%=os MOD 256:Y%=os DIV 256
  610 CALL &FFF7
  620 ENDPROC
  630 :
  640 DEF FNeaster(Y%)
  650 LOCAL M%,D%,I
  660 RESTORE ((FNgoldn(Y%)-1)*10)+1070
  670 FOR I=0 TO FNdomin(Y%):READ M%,D%:NEXT
  680 =FNday(D%,M%,Y%)
  690 :
  700 DEF FNgoldn(Y%):LOCAL gn:gn=(Y%+1) MOD 19:IF gn=0 THEN =19 ELSE =gn
  710 :
  720 DEF FNdomin(Y%)=(Y%+6+(Y% DIV 4)) MOD 7
  730 :
  740 DATA 4,16,4,15,4,21,4,20,4,19,4,18,4,17
  750 DATA 4,9,4,8,4,7,4,6,4,5,4,4,4,10
  760 DATA 3,26,3,25,3,24,3,30,3,29,3,28,3,27
  770 DATA 4,16,4,15,4,14,4,13,4,12,4,18,4,17
  780 DATA 4,2,4,1,4,7,4,6,4,5,4,3
  790 DATA 4,23,4,22,4,21,4,20,4,19,4,25,4,24
  800 DATA 4,9,4,15,4,14,4,13,4,12,4,11,4,10
  810 DATA 4,2,4,1,3,31,3,30,3,29,4,4,4,3
  820 DATA 4,23,4,22,4,21,4,20,4,19,4,18,4,17
  830 DATA 4,9,4,8,4,7,4,6,4,12,4,11,4,10
  840 DATA 3,26,4,1,3,31,3,30,3,29,3,28,3,27
  850 DATA 4,16,4,15,4,14,4,20,4,19,4,18,4,17
  860 DATA 4,9,4,8,4,7,4,6,4,5,4,4,4,3
  870 DATA 3,26,3,25,3,24,3,23,3,29,3,28,3,27
  880 DATA 4,16,4,15,4,14,4,13,4,12,4,11,4,17
  890 DATA 4,2,4,1,3,31,4,6,4,5,4,4,4,3
  900 DATA 4,23,4,22,4,21,4,20,4,19,4,18,4,24
  910 DATA 4,9,4,8,4,14,4,13,4,12,4,11,4,10
  920 DATA 4,2,4,1,3,31,3,30,3,29,3,28,4,3
  930 :
  940 DEF FNday(D%,M%,Y%):LOCAL I,T%
  950 RESTORE 980:T%=0:FOR I=1 TO M%:READ L%:T%=T%+L%:NEXT I
  960 =T%+D%-((M%>2) AND FNleap(Y%))
  970 :
  980 DATA 0,31,28,31,30,31,30,31,31,30,31,30,31
  990 :
 1000 DEF FNcentury(Y%)=1+(Y% DIV 100)
 1010 :
 1020 DEF FNyear(Y%)=Y% MOD 100
 1030 :
 1040 DEF FNleap(Y%):IF FNyear(Y%)=0 THEN=(Y% MOD 400=0) ELSE =(Y% MOD 4=0)
 1050 :
 1060 DEF FNweekday(D%,M%,Y%):LOCAL I,T%
 1070 T%=FNyear(Y%)+(FNyear(Y%) DIV 4)+D%+(6*(FNcentury(Y%)-20))
 1080 RESTORE 1110:FOR I=1 TO M%:READ m:NEXT I:IF M%<3 THEN m=m+FNleap(Y%)
 1090 =(T%+m) MOD 7
 1100 :
 1110 DATA 1,4,4,0,2,5,0,3,6,1,4,6
 1120 :
 1130 DEF FNddate(T%,Y%):LOCAL I:M%=FNmdate(T%,Y%):RESTORE 980:FOR I=1 TO M%:READ L%:L%=L%-(FNleap(Y%) AND (I=3)):T%=T%-L%:NEXT I
 1140 =T%
 1150 :
 1160 DEF FNmdate(T%,Y%):LOCAL I,V%:RESTORE 980:READ V%
 1170 M%=0:REPEAT:M%=M%+1:READ L%:L%=L%-(FNleap(Y%) AND(M%=2)):T%=T%-V%:V%=L%:UNTIL T%<=L% OR M%=12
 1180 =M%
 1190 :
 1200 DEF PROCdh(Y,c,f,m$):LOCAL I:I=(40-LENm$-3)/2:f=f*136:PRINTTAB(I,Y);CHR$141;CHR$c;CHR$f;m$;TAB(I,Y+1);CHR$141;CHR$c;CHR$f;m$:ENDPROC
 1210 :
 1220 DEF PROCerr(m$):VDU 7:PRINT:PROCdh(VPOS,133,1,"Error: "+m$):PROCdh(VPOS,133,1,"Press any key to continue"):G=GET:ENDPROC
 1230 :
 1240 DEF FNinput(X,Y,L%,O$,v$,N,P):LOCAL o$,n:flag=0:k=0:P=255+(P*32)
 1250 o$=O$:n=LEN O$:PRINTTAB(X,Y);CHR$133;">";TAB(X+2+L%,Y);"<"
 1260 REPEAT:PRINTTAB(X+2,Y);STRING$(L%,".");TAB(X+2,Y);o$;:REPEAT:G=GET:G$=CHR$(G AND (P+(32*(G>126 OR G<65)*(P=223)))):UNTIL INSTR(v$,G$)>0 OR v$="" OR INSTR(c$,G$)>0
 1270 IF ASCG$=&7F THEN o$=FNindel
 1280 IF ASCG$=&87 THEN o$=FNincop
 1290 IF ASCG$=&9 THEN o$=FNintab
 1300 IF ASCG$=&8A THEN flag=1
 1310 IF ASCG$=&8B THEN flag=-1
 1320 IF ASCG$>31 AND ASCG$<127 THEN o$=FNinadd(G$)
 1330 IF ASCG$=13 THEN flag=1
 1340 UNTIL flag<>0
 1350 IF N AND o$="" THEN 1260 ELSE=o$
 1360 :
 1370 DEF FNinadd(G$):IF n<L% THEN n=n+1:k=1:=o$+G$:ELSE VDU 7:=o$
 1380 :
 1390 DEF FNindel:IF n>0 THEN n=n-1:k=1:=LEFT$(o$,n):ELSE VDU 7:=o$
 1400 :
 1410 DEF FNincop:n=0:k=1:=""
 1420 :
 1430 DEF FNintab:n=LENO$:k=1:=O$
 1440 :
 1450 DEF PROCmulti(F%,N%,P%,X%,Y%,S%)
 1460 flag=0:n=F%:IF P% THEN PROCpurge
 1470 REPEAT:record$(n)=FNinput(X%,Y%+(S%*n),width%(n),title$(n),val$(n),nu(n),0)
 1480 PRINTTAB(X%+1,Y%+(S%*n));SPC(width%(n)+2);TAB(X%+1,Y%+(S%*n));CHR$134;record$(n)
 1490 title$(n)=record$(n)
 1500 IF flag=1 AND n<N% THEN n=n+1:flag=F%
 1510 IF flag=-1 AND n>F% THEN n=n-1
 1520 UNTIL flag=1 AND n=N%
 1530 ENDPROC
 1540 :
 1550 DEF PROCpurge:LOCAL I:FOR I=0 TO 11:record$(I)="":NEXT I:ENDPROC
 1560 :
 1570 DEF FNfilename
 1580 PRINTTAB(5,3);CHR$133;"Please enter the file name"
 1590 PRINTTAB(13,5);CHR$134;"Drive"
 1600 PRINTTAB(9,7);CHR$134;"Directory"
 1610 PRINTTAB(14,9);CHR$134;"Name"
 1620 width%(0)=1:width%(1)=1:width%(2)=7:title$(0)=MID$(f$,2,1):title$(1)=MID$(f$,4,1):title$(2)=MID$(f$,6):val$(0)="0123":val$(1)="":val$(2)="":nu(0)=-1:nu(1)=-1:nu(2)=-1
 1630 PROCmulti(0,2,TRUE,21,5,2)
 1640 =":"+record$(0)+"."+record$(1)+"."+record$(2)
 1650 ENDPROC
 1660 :
 1670 DEF PROCopen:CLS:PROCdh(0,133,0,"Open New File")
 1680 PROCopfi(FNfilename)
 1690 ENDPROC
 1700 :
 1710 DEF PROCcreate:LOCAL I,n:PROCclose:CLS:PROCdh(0,133,0,"Create New File"):ff$=FNfilename
 1720 PRINTTAB(5,14);CHR$133;"Year of Diary?":REPEAT:Yr%=VALFNinput(21,14,4,"","1234567890",-1,0):UNTIL Yr%>1889 AND Yr%<2100
 1730 PRINT':IF NOT FNsure("Create this file.") THEN ENDPROC
 1740 CLS:PROCdh(7,133,1,"Creating File "+ff$):PROCdh(10,133,1,"Please wait")
 1750  recn=366-FNleap(Yr%):rec=recn+1:f=12:RESTORE 1980:FOR I=0 TO 11:READ title$(I):width%(I)=30:NEXT I:recs=384
 1760 DUM=OPENOUT(ff$):CLOSE# DUM:DUM=OPENUP(ff$):PTR# DUM=(recn*recs):BPUT# DUM,48:CLOSE# DUM
 1770 F=OPENUP(ff$)
 1780 PTR# F=0:PRINT# F,rec,recn,recs,f:FOR I=0 TO 11:PRINT# F,width%(I),title$(I):NEXT:PTR# F=255
 1790 PROCpurge:record$(0)=STR$ Yr%:FOR I=0 TO 11:PRINT# F,record$(I):NEXT I
 1800 PRINTTAB(15,16);CHR$134;"Record"
 1810  D%=FNweekday(1,1,Yr%)-1:T%=1:FOR I=1 TO 12:RESTORE 980:FOR n=0 TO I:READ dd%:NEXT n:m$=FNmname(I):FOR n=1 TO dd%-(FNleap(Yr%) AND I=2):D%=(D%+1) MOD 7:record$(0)=FNdname(D%)+" "+STR$n+" "+m$+", "+STR$Yr%:PRINTTAB(23,16);T%:PROCwrite(T%)
 1820 T%=T%+1:NEXT n:NEXT I:PROCopfi(ff$):VDU 7:ENDPROC
 1830 :
 1840 DEF FNdname(T%):LOCAL d$,I:RESTORE 1860:FOR I=0 TO T%:READ d$:NEXT I:=d$
 1850 :
 1860 DATA Saturday,Sunday,Monday,Tuesday,Wednesday,Thursday,Friday
 1870 :
 1880 DEF FNmname(M%):LOCAL m$,I:RESTORE 1900:FOR I=1 TO M%:READ m$:NEXT I:=m$
 1890 :
 1900 DATA January,February,March,April,May,June,July,August,September,October,November,December
 1910 :
 1920 DEF PROCptr(I):PTR# F=255+(recs*I):ENDPROC
 1930 :
 1940 DEF PROCwrite(I):LOCALn:PROCptr(I):FORn=0 TO11:PRINT#F,record$(n):NEXTn:ENDPROC
 1950 :
 1960 DEF PROCread(I):LOCAL n:PROCptr(I):FOR n=0 TO 11:INPUT# F,record$(n):NEXT n:ENDPROC
 1970 :
 1980 DATA Date,Title,Memo,Memo,Memo,Memo,Memo,Memo,Memo,Memo,Memo,Memo
 1990 :
 2000 DEF PROCsh(Y,C,F,m$):LOCAL I:I=(40-LENm$-2)/2:PRINTTAB(I,Y);CHR$C;CHR$(F*136);m$:ENDPROC
 2010 :
 2020 DEF PROCscanrec(rec):PROCread(rec):CLS:PROCdh(0,133,0,record$(0))
 2030 PROCsh(3,134,0,record$(1))
 2040 FOR n=1 TO 10:PRINTTAB(6,4+n);CHR$134;record$(n+1):NEXT n
 2050 FOR n=1 TO 10:PRINTTAB(1,4+n);CHR$134;n:NEXT n
 2060 ENDPROC
 2070 :
 2080 DEF PROCscan:IF NOT open% THEN VDU 7:ENDPROC
 2090 LOCAL I,n
 2100 REPEAT:PROCscanrec(CD%)
 2110 PRINTTAB(0,16);CHR$133;"[    Yesterday";TAB(20,16);"]  Tomorrow";TAB(0,17);CHR$133;"COPY Edit Memos";TAB(20,17);"TAB Edit Title";TAB(0,18);CHR$133;"G Go to Day";TAB(20,18);"S   Search Diary";
 2120 REPEAT:G=GET:UNTIL G>&86 AND G<&8A OR G=9 OR (G AND 223)=71 OR (G AND 223)=83
 2130 IF G=&88 THEN CD%=FNcdy
 2140 IF G=&89 THEN CD%=FNcdt
 2150 IF G=&87 THEN PROCeditm
 2160 IF G=9 THEN PROCeditt
 2170 IF (G AND223)=71 THEN PROCgtd
 2180 IF (G AND223)=83 THEN PROCinterr
 2190 UNTIL FALSE:ENDPROC
 2200 :
 2210 DEF FNcdy:IF CD%=1 THEN =recn-1 ELSE =CD%-1
 2220 :
 2230 DEF FNcdt:IF CD%=recn-1 THEN =1 ELSE =CD%+1
 2240 :
 2250 DEF PROCeditm:LOCAL I,n:FOR I=2 TO 11:title$(I)=record$(I):nu(I)=0:width%(I)=30:val$(I)="":NEXT I
 2260 FOR I=16 TO 18:PRINTTAB(0,I);SPC(39);:NEXT I
 2270 PRINTTAB(0,17);CHR$133;"RETURN/DOWN at last field to end"
 2280 PROCmulti(2,11,0,5,3,1)
 2290 PRINTTAB(0,17);SPC(39):IF NOT FNsure("Save these entries") THEN ENDPROC
 2300 PROCwrite(CD%):ENDPROC
 2310 :
 2320 DEF PROCgtd:LOCAL I,n,v:IF NOT open% THEN VDU 7:ENDPROC:ELSE:REPEAT:CLS:PROCdh(0,133,0,"GO TO DAY"):PROCsh(3,133,0,"Please enter the date you require:")
 2330 title$(0)="":val$(0)="0123456789":nu(0)=-1:width%(0)=2:title$(1)="":val$(0)="0123456789":nu(0)=-1:width%(1)=2
 2340 PRINTTAB(16,5);CHR$134;"Day";TAB(14,7);CHR$134;"Month"
 2350 PROCmulti(0,1,TRUE,20,5,2)
 2360 v=0:M%=VALrecord$(1):D%=VALrecord$(0):IF M%>12 OR M%<1 THEN v=1 ELSE RESTORE 980:FOR I=0 TO M%:READ dd%:NEXT I:IF D%>dd%-(FNleap(Yr%) AND M%=2) THEN v=1
 2370 IF v=1 THEN PROCerr("Invalid Date!")
 2380 UNTIL v=0
 2390 CD%=FNday(D%,M%,Yr%):PROCscan:ENDPROC
 2400 :
 2410 DEF PROCeditt:LOCAL I,n:FOR I=16 TO 18:PRINTTAB(0,I);SPC(39);:NEXT I
 2420 PROCsh(16,133,0,"Enter the new title above."):record$(1)=FNinput(3,3,30,record$(1),"",0,0):PRINTTAB(0,17)
 2430 IF NOT FNsure("Save this title.") THEN ENDPROC
 2440 PROCwrite(CD%):ENDPROC
 2450 :
 2460 DEF PROCinterr:LOCAL I,n:IF NOT open% THEN VDU 7:ENDPROC
 2470 REPEAT:PROCintmen:UNTIL FALSE
 2480 ENDPROC
 2490 :
 2500 DEF PROCintmen:CLS:PROCdh(0,133,0,"Search Menu"):PRINT'CHR$133;"Settings: ";:IF fu THEN PRINT"Fuzzy, ";:ELSE PRINT"Specific, ";
 2510 IF vi THEN PRINT"View." ELSE PRINT"Edit."
 2520 PRINT:RESTORE 2640:READ m$:REPEAT:PRINTCHR$134;m$:READ m$:UNTIL m$="*"
 2530 PRINT'CHR$133;"Please select the option you require";
 2540 *FX 225,240
 2550 REPEAT:G=GET:UNTIL G>239 AND G<250
 2560 IF G=240 THEN PROCsearch
 2570 IF G=241 THEN fu=NOTfu
 2580 IF G=242 THEN vi=NOTvi
 2590 IF G=243 THEN PROCselfl
 2600 IF G=244 THEN PROCseltg
 2610 *FX 225,1
 2620 ENDPROC
 2630 :
 2640 DATA f0 - Begin Search,f1 - Toggle Fuzzy/Specific,f2 - Toggle View/Edit,f3 - Select Field,f4 - Select Target,"",ESCAPE returns to Options Menu,*
 2650 :
 2660 DEF PROCselfl:CLS:PROCdh(0,133,0,"Select Search Field"):PROCsh(3,134,0,"Current Search Field: "+cf$):PROCsh(5,133,0,"Enter new Search Field below:"):PRINTTAB(5,7);CHR$134;"A = Any Field";TAB(5,8);CHR$134;"T = Title Field"
 2670 PRINTTAB(5,9);CHR$134;"M = All Memo Fields";TAB(2,10);CHR$134;"1-10 = Specific Memo Field"
 2680  REPEAT:cf$=FNinput(18,12,2,cf$,"0123456789ATM",-1,-1):UNTIL cf$="T" OR cf$="A" OR cf$="M" OR (VALcf$>0 AND VALcf$<11)
 2690 ENDPROC
 2700 :
 2710 DEF PROCseltg:CLS:PROCdh(0,133,0,"Select Search Target"):PROCsh(3,133,0,"Enter new Search Target below:")
 2720 ser$=FNinput(3,5,30,ser$,"",0,0)
 2730 ENDPROC
 2740 :
 2750 DEF PROCsearch:LOCAL I,n,t,f,flag:f=VALcf$+1:flag=-1:IF cf$="A" THEN f=100 ELSE IF cf$="M" THEN f=200
 2760 FOR I=1 TO recn:PROCread(I):PROCplw:t=0:FOR n=1 TO 11:t=FNser(record$(n),ser$,f)
 2770 NEXT n:CD%=I:IF vi AND t THEN PROCscanrec(CD%):PRINTTAB(0,19);CHR$133;"Press SPACE BAR to continue";:REPEAT:UNTIL GET=32:flag=-1:ELSE IF t PROCscan
 2780 t=0:NEXT I
 2790 ENDPROC
 2800 :
 2810 DEF FNser(f$,t$,f):IF t THEN =t
 2820 IF n<>f AND f<100 THEN =t ELSE IF f=200 AND f=1 THEN =t
 2830 IF fu AND INSTR(f$,t$)>0 AND f$<>"" THEN =TRUE
 2840 IF f$=t$ THEN =TRUE
 2850 =FALSE
 2860 :
 2870 DEF PROCplw:IF flag THEN CLS:PROCdh(7,133,1,"SEARCHING"):PROCdh(10,133,1,"Please wait"):flag=0
 2880 ENDPROC
 2890 :
 2900 DEF PROCautocal:LOCAL I,n,e,m$,k
 2910 IF NOT open% THEN VDU 7:ENDPROC
 2920 CLS:PROCdh(7,133,1,"Inserting Calendrical Information"):PROCdh(10,133,1,"Please wait")
 2930 e=FNeaster(Yr%):CD%=e:PROCread(CD%):record$(1)="Easter Sunday":PROCwrite(CD%)
 2940 RESTORE 3090:FOR I=1 TO 10:READ n,m$:PROCread(e+n):record$(1)=m$:PROCwrite(e+n):NEXT I
 2950 k=4109:REPEAT:k=k+1:RESTORE k:READ Dd%,Mm%,m$:n=FNday(Dd%,Mm%,Yr%):PROCread(n):record$(1)=m$:PROCwrite(n):UNTIL m$=""
 2960 FOR I=1 TO 3:RESTORE k+I:READ D%,M%,r:w=FNweekday(D%,M%,Yr%):IF w=0 THEN W=7 ELSE IF w=1 THEN w=8
 2970 m=r-w:n=FNday(D%,M%,Yr%)+m:PROCread(n):IF record$(1)="" THEN record$(1)="Bank Holiday" ELSE record$(1)=LEFT$(record$(1)+" (BH)",30)
 2980 PROCwrite(n):NEXT I
 2990 IF FNweekday(D%,M%,Y%)=0 THEN n=n+2
 3000 IF FNweekday(D%,M%,Y%)=1 THEN n=n+1
 3010 m=FNweekday(1,1,Yr%):IF m=0 THEN n=3 ELSE IF m=1 THEN n=2 ELSE n=1
 3020 PROCread(n):record$(1)=LEFT$(record$(1)+" (Hol)",30):PROCwrite(n)
 3030 m=1-FNweekday(30,11,Yr%):IF ABS m>3 THEN m=SGNm*(7-ABSm)
 3040 n=FNday(30,11,Yr%)+m:PROCread(n):record$(1)="Advent Sunday":PROCwrite(n)
 3050 n=FNday(25,12,Yr%):m=FNweekday(25,12,Yr%):IF m>1 THEN ENDPROC:FOR I=0 TO m:PROCread(n+I+1):IF record$(1)="" THEN record$(1)="Bank Holiday" ELSE record$(1)=LEFT$(record$(1)+" (BH)",30)
 3060 PROCwrite(n+I+1):NEXT I
 3070 ENDPROC
 3080
 3090 DATA -63,Septuagesima Sunday,-56,Sexagesima Sunday,-49,Quinquagesima Sunday,-42,Quadragesima Sunday,35,Rogation Sunday,39,Ascension Day,49,Whit-Sunday,56,
```

```
Trinity Sunday,-2,Good Friday (BH),1,Eas
ter Monday (GB)
 3100 DATA 1,1,Circumcision of Our Lord
 3110 DATA 8,9,The Blessed Virgin Mary
 3120 DATA 6,1,Epiphany of Our Lord
 3130 DATA 25,1,Conversion of St Paul
 3140 DATA 2,2,Purif of the Virgin Mary
 3150 DATA 14,2,St. Valentine
 3160 DATA 24,2,St. Matthias
 3170 DATA 25,3,Annunciation of Virgin M
ary
 3180 DATA 23,4,St. George
 3190 DATA 1,5,St. Philip & St. James
 3200 DATA 11,6,St. Barnabas
 3210 DATA 24,6,St. John the Baptist
 3220 DATA 29,6,St. Peter
 3230 DATA 2,7,Visitation of Virgin Mary
 3240 DATA 22,7,St. Mary Magdalen
 3250 DATA 25,7,St. James
 3260 DATA 6,8,Transfiguration
 3270 DATA 24,8,St. Bartholemew
 3280 DATA 14,9,Holy Cross Day
 3290 DATA 21,9,St. Matthew
 3300 DATA 29,9,St. Michael & All Angels
 3310 DATA 30,9,St. Jerome
 3320 DATA 18,10,St. Luke
 3330 DATA 28,10,St. Simon & St. Jude
 3340 DATA 1,11,All Saints' Day
 3350 DATA 30,11,St. Andrew
 3360 DATA 21,12,St. Thomas
 3370 DATA 25,12,Christmas Day
 3380 DATA 27,12,St. John Evangelist
 3390 DATA 28,12,Holy Innocents
 3400 DATA 2,11,All Souls' Day
 3410 DATA 30,11,St. Andrew
 3420 DATA 21,12,St. Thomas
 3430 DATA 25,12,Christmas Day
 3440 DATA 27,12,St. John Evangelist
 3450 DATA 28,12,Holy Innocents
 3460 DATA 1,3,St. David
 3470 DATA 17,3,St. Patrick
 3480 DATA 24,12,Christmas Eve
 3490 DATA 31,10,Hallowe'en
 3500 DATA 26,12,St. Stephen. Boxing Day
.
 3510 DATA 5,11,Guy Fawkes' Night
 3520 DATA 0,0,""
 3530 DATA 1,5,9
 3540 DATA 31,5,2
 3550 DATA 31,8,2
 3560 :
 3570 DEF PROChelp:REPEAT:CLS:PROCdh(0,1
33,0,"Help Menu"):PRINT':RESTORE 3650
 3580 READ m$:REPEAT:PRINTCHR$(134);m$:R
EAD m$:UNTIL m$="*":PRINT
 3590 PRINTCHR$(133);"Select the Subject
 you require";:*FX 225,240
 3600 REPEAT:G=GET:UNTIL G<248 AND G>239
 3610 *FX 225
 3620 RESTORE (G*10)+3000:CLS:READ m$:PR
OCdh(0,133,0,"Help - "+m$):PRINT:READ m$
:PROCsh(3,133,0,m$):PRINT:READ m$:REPEAT
:PRINT m$:READ m$:UNTIL m$="*":PRINTTAB(
0,19);CHR$133;"Press any key to continue
";:G=GET
 3630 UNTIL FALSE:ENDPROC
 3640 :
 3650 DATA f0 - The Versatile Input Edit
or,f1 - Creating a Diary,f2 - Opening a
Diary,f3 - Browsing through a Diary,f4 -
 Editing Diary entries,f5 - Searching a
Diary,f6 - Auto-Calendrical Information,
f7 - Operating System Commands,*
 3660 DATA The Editor,""
 3670 DATA "When the Editor is in use (i
e when you enter data in magenta between
 the >.< signs) the following keys are u
sed :-","","COPY deletes the whole line"
,"TAB restores the line"," RETURN, UP, D
OWN,end the editing",""
 3680 DATA "When editing several fields,
 UP and     DOWN move freely between the
m. Only     the current field is in mage
nta.","*"
 3690 DATA Creating a Diary
 3700 DATA "OPTIONS MENU, f5","You just
enter a name for the Diary    File (Driv
e, Directory, Filename) and  the year fo
r which the diary is to be  created. HEM
ERA creates the Diary automatically. Thi
s takes quite some time"
 3710 DATA "to finish, so be patient!",*
 3720 DATA Opening a Diary,"OPTIONS MENU
, f0"
 3730 DATA "Before you can browse throug
h or edit  a Diary, you must OPEN it, mu
ch like   opening up a real book.","","T
o open a Diary, select Option f0 from th
e Options Menu and enter the drive,  dir
ectory, and name of the Diary."
 3740 DATA "HEMERA will open the Diary f
or you.   When the Diary is open, its n
ame is    written under the title of the
 Options Menu."
 3750 DATA *
 3760 DATA Browsing,"OPTIONS MENU, f1"
 3770 DATA "When you select this option,
 the Diary is displayed day by day. Cale
ndrical   Information (Saints' Days, Hol
idays,   etc.) is shown underneath the d
ate,    and up to 10 memoranda beneath t
hat.",""
 3780 DATA "The keys [and ] are used to
move back and forth in the Diary.","","T
o make larger jumps, press G and enter t
he date you require. This is also ava-il
able from the Options Menu, f3.",*
 3790 DATA Editing a Diary,"OPTIONS MENU
, f1"
 3800 DATA "When browsing through a Diar
y, the     following keys allow you to e
dit the   entries for the day on the scr
een:-","","TAB lets you change the Calen
drical    heading."
 3810 DATA "","COPY lets you edit the me
moranda. The  normal Editor controls (qv
) are now    in use. DOWN or RETURN at M
emo 10 ends  the editing.",*
 3820 DATA Searching a Diary,"OPTIONS ME
NU, f4"
 3830 DATA "FUZZY means that the search
target is  contained within the target f
ield."," SPECIFIC means that the search
target  must actually be the target fiel
d.",""," VIEW displays all days which fu
lfill    the search criteria in turn."
 3840 DATA " EDIT puts you in Browse Mod
e at the    first day which fulfills the
 criteria.","","The TARGET FIELD is the
field yoy wish to search.","The SEARCH T
ARGET is the word or phrase you are look
ing for.",*
 3850 DATA Calendrical Data,"OPTIONS MEN
U, f2"
 3860 DATA "Calendrical Information incl
udes such  things as Saints' Days, Holid
ays, etc. These will be calculated and i
nserted  into the Diary automatically at
 the    press of f2.",*
 3870 DATA OS Commands,"or * Commands"
 3880 DATA "Operating System Commands ar
e those    that begin with an asterisk,
eg *CAT,   *DRIVE, *INFO, *HELP.","","Yo
u may enter any * Command from the   Opt
ions Menu. Avoid Commands which may affe
ct the Computer's memory, such as:"
 3890 DATA "*LOAD, *COMPACT, *COPY, *BAC
KUP",*
 3900 :
 3910 DEF PROCprint:LOCAL I,n,v:IF NOT o
pen% THEN VDU 7:ENDPROC
 3920 PROCon
 3930 REPEAT:CLS:PROCdh(0,133,0,"Printer
 Options Menu")
 3940 PRINT':RESTORE 4110:READ m$:REPEAT
:PRINTCHR$134;m$:READ m$:UNTIL m$="*"
 3950 PRINT'CHR$133;"Please select the O
ption you require";:
 3960 *FX 225,240
 3970 REPEAT:G=GET:UNTIL G>239 AND G<250
 3980 IF G=241 THEN PROCmonthppfs
 3990 IF G=242 THEN PROCweekppfs
 4000 IF G=243 THEN PROCdayppfs
 4010 IF G=244 THEN PROCmonthppsm
 4020 IF G=245 THEN PROCweekppsm
 4030 IF G=246 THEN PROCdayppsm
 4040 UNTIL FALSE
 4050 ENDPROC
 4060 :
 4070 DEF FNon:*FX 21,3
 4080 VDU 2,1,0,1,0,3:=(ADVAL-4=63)
 4090 DEF PROCon:IF FNon THEN ENDPROC:EL
SE CLS:VDU 7:PROCdh(5,133,0,"The Printer
 is off-line."):PROCdh(8,133,0,"Please p
ress the ON LINE button,"):PROCdh(11,133
,0,"or turn the Printer ON."):REPEAT:UNT
IL FNon:ENDPROC
 4100 :
 4110 DATA "f1 - Month per page, full si
ze","f2 - Week per page, full size","f3
- Day per page, full size","","f4 - Mont
h per page, FiloFax size","f5 - Week per
 page, FiloFax size"
 4120 DATA "f6 - Day per page, FiloFax s
ize",*
 4130 :
 4140 DEF PROCpc(f):LOCAL I:RESTORE f+61
40:READ I:REPEAT:VDU 1,I:READ I:UNTIL I=
500
 4150 ENDPROC
 4160 :
 4170 DATA 15,500
 4180 DATA 18,500
 4190 DATA 27,87,1,500
 4200 DATA 27,87,0,500
 4210 DATA 27,71,500
 4220 DATA 27,72,500
 4230 DATA 27,83,0,500
 4240 DATA 27,84,500
 4250 DATA 27,45,1,500
 4260 DATA 27,45,0,500
 4270 DEF FNgetcha(X,Y,P,v$):LOCAL G
 4280 PRINTTAB(X,Y);CHR$(133);">";TAB(X+
3,Y);"<";TAB(X+2,Y);
 4290 REPEAT:G=GET:IF P THEN G=G AND &DF
 4300 UNTIL INSTR(v$,CHR$G)>0:PRINTTAB(X
+2,Y);CHR$G
 4310 =CHR$G
 4320 :
 4330 DEF FNwhole:LOCAL G$:PRINTTAB(0,5)
;CHR$134;"Whole year, or one month? (Y/M
)":G$=FNgetcha(32,5,-1,"YM")
 4340 IF G$="Y" THEN =-1
 4350 PRINTTAB(14,7);CHR$134;"Month":REP
EAT:m=VALFNinput(21,7,2,"","0123456789",
-1,0):UNTIL m>0 AND m<13
 4360  =m
 4370 :
 4380 DEF FNpause
 4390 PRINTTAB(5,9);CHR$134;"Pause betwe
en pages? (Y/N)":=(FNgetcha(32,9,-1,"YN"
)="Y")
 4400 :
 4410 DEF FNlength:LOCAL I:PRINTTAB(5,11
);CHR$134;"Page length (in lines) :":REP
EAT:I=VALFNinput(31,11,2,"65","012345678
9",-1,0):UNTIL I>64 AND I<70:=I
 4420 :
 4430 DEF PROCdayppfs:LOCAL I,n,v,G,pa,p
l,pg:pg=0
 4440 CLS:PROCdh(0,133,0,"Day Per Page,
Full Size"):M%=FNwhole:pa=FNpause:pl=FNl
ength
 4450 PRINTTAB(0,18);:IF NOT FNsure("Pri
nt diary.")THEN ENDPROC
 4460 VDU 2:PROCdayper1(70,pl,pa,20,-1,5
6):ENDPROC
 4470 :
 4480 DEF PROCdayper1(wi,pl,pa,li,sp,pu)
:pg=0:LOCAL I,n:IF M%=-1 THEN A=1:B=12:E
LSE A=M%:B=M%
 4490 FOR I=A TO B
 4500 M$=FNmname(M%)+" "+STR$Yr%
 4510 RESTORE 980:FOR n=0 TO I:READ dd%:
NEXT n:FOR D%=1 TO dd%-(FNleap(Yr%) AND(
I=2)):PROCread(FNday(D%,M%,Yr%))
 4520 PRINTTAB(5);:PROCpc(8):pg=NOT pg:I
F pg THEN PRINTSPC(wi-LENM$);
 4530 PRINT M$;:IF NOT pg THEN PRINTSPC(
wi-LENM$);
 4540 PROCpc(9):PRINT:m$=FNdname(FNweekd
ay(D%,M%,Yr%))+" "+STR$D%:n=LENm$*2:PRIN
T'TAB(5-pg*(wi-n));:PROCpc(2):PRINTm$:PR
OCpc(3):n=LENrecord$(1):PRINTTAB(5-pg*(w
i-n));record$(1)
 4550 PRINT:FOR n=2 TO 11:PRINTTAB(5);re
cord$(n):NEXT n
 4560 PRINT:PROClines(wi,li,sp):PROCpad(
pl-pu)
 4570 IF pa THEN PROCpause
 4580 NEXT D%:NEXT I:VDU 3
 4590 ENDPROC
 4600 :
 4610 DEF PROCpause:VDU 3
 4620 CLS:VDU 7:PROCdh(7,134,1,"PAPER!")
:PROCdh(10,133,0,"Press any key to conti
nue"):G=GET:VDU 2:ENDPROC
 4630 :
 4640 DEF PROClines(l,n,sp):LOCAL I:FOR
I=1 TO n:IF sp THEN PRINT
 4650 PRINTTAB(5);STRING$(l,"_"):NEXT I:
ENDPROC
 4660 :
 4670 DEF PROCpad(n):LOCAL I:FOR I=1 TO
n:PRINT:NEXT I:ENDPROC
 4680 :
 4690 DEF PROCdayppsm:LOCAL I,G,n,v:CLS:
PROCdh(0,133,0,"Day Per Page, FiloFax Si
ze"):M%=FNwhole:pa=FNpause:PRINTTAB(0,18
);:IF NOT FNsure("Print diary.")THEN END
PROC
 4700 VDU 2:PROCpc(0):PROCdayper1(46,41,
pa,19,0,36):VDU 2:PROCpc(1):VDU 3:ENDPRO
C
 4710 :
 4720 DEF PROCmonthppfs:CLS:PROCdh(0,133
,0,"Month Per Page, Full Size"):M%=FNwho
le:IF M%=-1 THEN pa=FNpause ELSE pa=0
 4730 pl=FNlength:PRINTTAB(0,18);:IF NOT
 FNsure("Print Diary.")THEN ENDPROC
 4740 VDU 2:PROCmonthper1(70,pl,1,2):END
PROC
 4750 :
 4760 DEF PROCmonthper1(wi,pl,li,ad):LOC
AL I,n
 4770 pg=0:IFM%=-1 THEN A=1:B=12:ELSE A=
M%:B=M%
 4780 FOR I=A TOB
 4790 pg=NOT pg:M$=FNmname(I)+" "+STR$Yr
%:RESTORE 980:FOR n=0 TO I:READ dd%:NEXT
 n:v=1+(dd%*(1+li))
 4800 n=LENM$*2-ad:PRINTTAB(5);:PROCpc(8
):IF pg THEN PRINTSPC(wi-n);
 4810 PROCpc(2):PRINT M$;:PROCpc(3):IF N
OT pg THEN PRINTSPC(wi-n);
 4820 PROCpc(9):PRINT:FOR n=1 TO dd%-(FN
leap(Yr%) AND I=2):PRINTTAB(5);:IF li=0
THEN PROCpc(8)
 4830 PROCread(FNday(n,I,Yr%)):PROCpc(2)
:PRINT;n;TAB(8);LEFT$(record$(0),1);:PRO
Cpc(3):PRINT" ";record$(1);SPC(wi-6-LENr
ecord$(1))
 4840 IF li=1 THEN PRINTTAB(5);:PROCpc(8
):PRINTTAB(14);record$(2);SPC(wi-7-LENre
cord$(2))
 4850 PROCpc(9):NEXT n:PROCpad(pl-v):IF
pa PROCpause
 4860 NEXT I:VDU 3:ENDPROC
 4870 :
 4880 DEF PROCmonthppsm:CLS:PROCdh(0,133
,0,"Month Per Page, FiloFax Size"):M%=FN
whole:IF M%=-1 THEN pa=FNpause ELSE pa=0
 4890 PRINTTAB(0,18);:IF NOT FNsure("Pri
nt Diary.")THEN ENDPROC
 4900 VDU 2:PROCpc(0):PROCmonthper1(46,4
1,0,3):VDU 2:PROCpc(1):VDU 3:ENDPROC
 4910 :
 4920 DEF PROCweekper1(wi,pl,li,pd):pg=0
 4930 LOCAL I,n,v,m$,k$:v=FNweekday(1,1,
Yr%)
 4940 FOR I=A TO B:n=FNmdate(I*7,Yr%):k$
=FNmname(n)+" "+STR$Yr%:pg=NOTpg
 4950 PRINTTAB(5);:PROCpc(8):IF pg THEN
PRINT SPC(wi-LENk$);
 4960 PRINT k$;:IF NOT pg THEN PRINTSPC(
wi-LENk$);
 4970 PROCpc(9):PRINT'
 4980 FOR Dd=1 TO 7:D=Dd MOD 7:IF Dd<v A
ND I=0 OR Dd>FNweekday(31,12,Yr%) AND I=
52 THEN PROCnull ELSE PROCwppday
 4990 NEXT Dd:PROCpad(pl-pd):IF pa THEN
PROCpause
 5000 NEXT I:VDU 3:ENDPROC
 5010 :
 5020 DEF PROCnull:LOCAL I:FOR I=1 TO li
+3:PRINT:NEXT I:PRINTTAB(5);:PROCpc(8):P
RINTSPC(wi):PROCpc(9):ENDPROC
 5030 :
 5040 DEF PROCwppday:PROCread((I*7)+Dd+1
-v):n=FNddate((I*7)+Dd+1-v,Yr%):M%=FNmda
te((I*7)+Dd+1-v,Yr%):m$=FNdname(FNweekda
y(n,M%,Yr%))+" "+STR$n
 5050 PRINTTAB(5-pg*(wi-(LENm$*2)));:PRO
Cpc(2):PRINT m$:PROCpc(3):PRINTTAB(5-pg*
(wi-LENrecord$(1)));record$(1):n=NOTpg
 5060 FOR x=2 TO li+2:PRINTTAB(5-n*(wi-L
ENrecord$(x)));record$(x):NEXT x:PRINTTA
B(5);:PROCpc(8):PRINTSPC(wi):PROCpc(9):E
NDPROC
 5070 :
 5080 DEF PROCweekppfs:CLS:PROCdh(0,133,
0,"Week Per Page, Full Size"):M%=FNwhole
:pa=FNpause:pl=FNlength:PRINTTAB(0,18);:
IF NOT FNsure("Print Diary.") THEN ENDPR
OC
 5090 IF M%=-1 THEN A=0:B=52:ELSE PROCno
tall
 5100 VDU 2:PROCweekper1(70,pl,4,60):END
PROC
 5110 :
 5120 DEF PROCnotall:A=FNday(1,M%,Yr%) D
IV 7:RESTORE 980:FOR I=0 TO M%:READ Dd%:
NEXT I:B=FNday(Dd%,M%,Yr%) DIV 7:IF FNwe
ekday(Dd%,M%,Yr%)=0 THEN B=B-1
 5130 ENDPROC
 5140 :
 5150 DEF PROCweekppsm:CLS:PROCdh(0,133,
0,"Week Per Page, FiloFax Size"):M%=FNwh
ole:pa=FNpause:IF M%=-1 THEN A=0:B=52:EL
SE PROCnotall
 5160 PRINTTAB(0,18);:IF NOT FNsure("Pri
nt Diary.")THEN ENDPROC
 5170 VDU 2:PROCpc(0):PROCweekper1(46,41
,1,40):VDU 2:PROCpc(1):VDU 3:ENDPROC
```

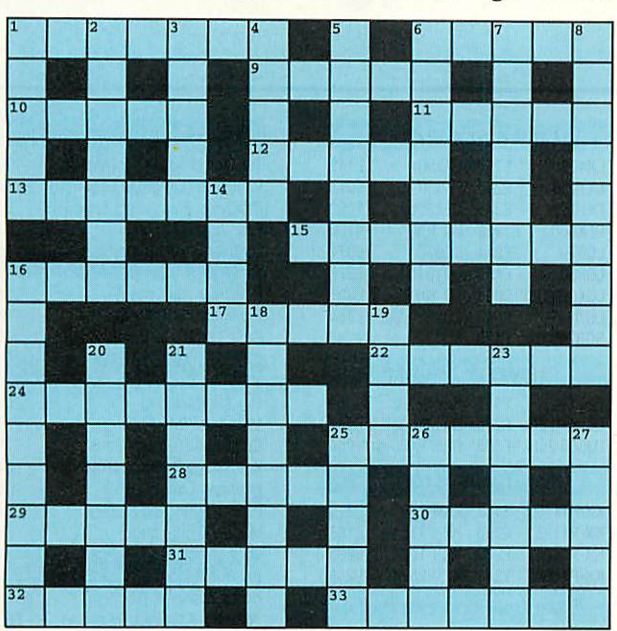
ARM PROGRAMMING

Listing 1 - Arm1

```
10 REM >ARM1 (ArmProg1)
20 REM By Dave Lawrence
30 REM For 32 bit machines
40 REM (C) BAU August 1992
50 :
60 DIM code 100
70 link=14
80 pc=15
90 FOR pass=0 TO 2 STEP 2
100 P%=code
110 [OPT pass
120 .fortest
130         MOV     R1,#10
140 .loop
150         SWI     256+ASC"*"
160         SUBS    R1,R1,#1
170         BNE     loop
180
190         MOV     pc,link
200 ]NEXT
210 PRINT "Press SPACE to print stars!
:";
220 IF GET
230 CALL fortest
```



BBC Acorn User cryptic crossword, August 1992



Across

1 Alleged medical corruption (7)
6 Canvass for support? Quite the contrary we're told (5)
9 Manual section? (5)
10 Graduate in charge after inaugural shake-up is 24 (5)
11 Saturn's largest moon enters multi-tangential orbit (5)
12 Picture cinematographer occasionally shows (5)
13 Outlook has reversed, so beware! (7)
15 Professor uses a rat and mice experimentally (8)
16 Gadget turns small fellow's head (6)
17 Go one better with barbecue perhaps? (5)
22 Pinch silver for example (6)
24 Swearing is bad! (8)
25 No. 24 bruised leg, shin,... (7)
28 ...arm - nearly everything begins to cause distress (5)
29 Be last and first (5)
30 Parking one will cost you! (5)
31 Nitre? Unstable? No! (5)
32 Book 99 makes sense (5)
33 Disfigured when red cars crashed (7)

Down

1 24 see movie in relaxed surroundings (5)
2 Sailors dupe duke and beat it! (7)
3 Often attached to second processor etc (5)
4 3 or 4, say, poke the thing (5)
5 Difficult ahead (8)
6 Offers increases (7)
7 Japanese Mandarin always sporting an orange jacket! (7)
8 New places and scenery (9)
14 Count Orf is formal to the core (4)
16 Well, a home-baked loaf is better for you! (9)
18 SDP argue for reform and improvements (8)
19 Unlock old cage... (4)
20 ...releasing tiny gnu that's distressed (7)
21 Crazy Australian lost in nautical disaster (7)
23 He's a pilot and, for the most part, a navigator! (7)
25 Gives out point after time is up (5)
26 Does Ray work at Sellafield? (5)
27 "Let her? I'd be daft!" (5)

Send your entry to *BBC Acorn User*, 101 Bayham Street, London NW1 0AG, to reach us by Friday August 14 1992.



Please mark your envelope August Crossword. Photocopies of your solution are acceptable. The solution and winner will be published in the October issue. The winner of June's crossword will be published next month, the solution is shown on the left. Answers to all clues can be found in Chambers English Dictionary (1988 edition).

Changing colour

Can you change the word blue into the word cyan in six or fewer steps? Each step involves changing one and only one letter of the previous stage and the new word must be a valid one.

BLUE

____

____

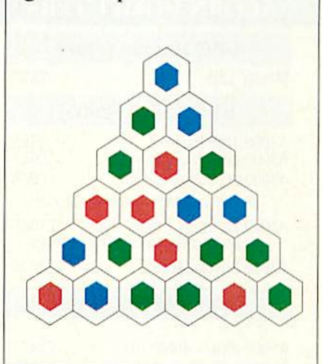
____

____

CYAN

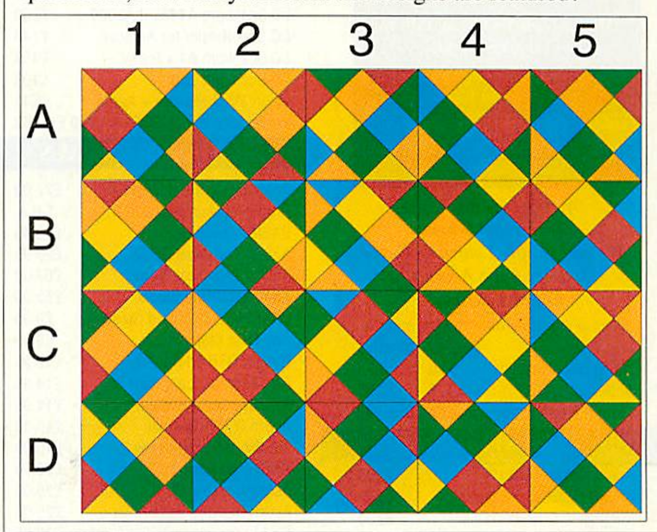
Hex-tricate

Can you divide this triangle into three *identically shaped* pieces each containing two blue, two red and three green shapes?



Few-tile?

Although the colourful mosaic below looks complex, it is made up of only a small number of different tile designs. These may appear rotated or even reflected in more than one location. The question is, how many different tile designs are featured?

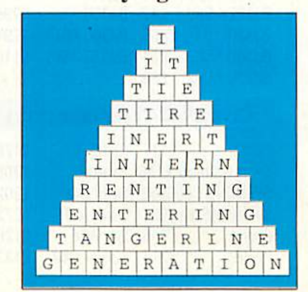


July's Solutions

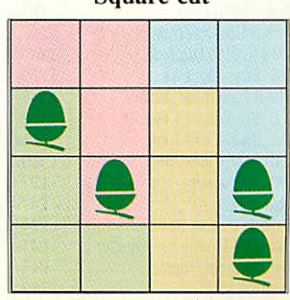
Synonanagrammatisation!

open: overt, liberal, begin
pronounce: speak, diagnose, declaim
peers: equals, scrutinise, earls
separate: split, solitary, estrange
bands: ties, circles, consolidates

Pyragram



Square-cut



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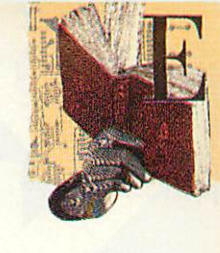
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[24.06.92]







THREE EASY PIECES

Chris Drage examines a suite of programs that aims to make learning enjoyable

Children really enjoy practising the skills that computer programs demand. H.S. Software has established a reputation for programs which are fun and easy to use and, in my experience, children usually love them. The *Fun & Games* suite is no exception.

Comprising three programs on three discs and a small instruction sheet, *Fun & Games* offers activities which cover a wide range of abilities and skills.

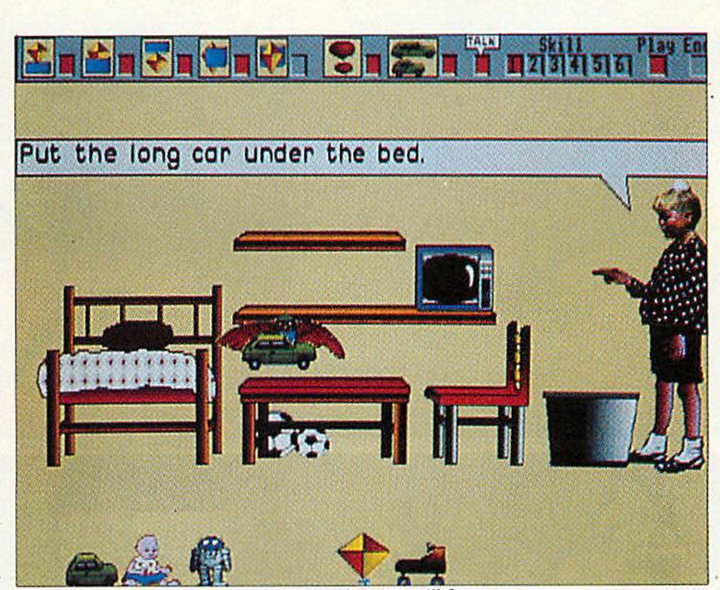
Each program takes over the whole screen and works in the 256-colour mode 15. All three share a common menu bar from which the various options are available and the program can be run or ended. Similarly, they all use good quality digitised pictures with smooth animations and make extensive use of clear digitised speech.

Burger Boy involves making up orders in a burger bar from a choice of burgers, chips and drinks. This game covers a wider range of abilities and skills: reading, matching, sequencing, auditory and visual memory and addition of monetary units. It has four levels within which both a four year or an eight year old will be challenged. Once an order is complete, the greedy customer scoffs the lot with over-indulgent sound effects!

Tidy is a quiet game in which the user is invited to help Emma tidy up her bedroom by guiding her parrot to put all her toys away. Again, it is a game for practising a range of skills including early reading, comparing objects of different shape and size but particularly for its use of prepositions.

In *Coconuts*, the aim is to help a screen character pick the right fruits from the tropical trees to complete a pattern shown on the screen. The program offers skills such as sequencing and helping the child to devise and repeat patterns on screen.

In the game there is a choice of four fruits which can be displayed in different sizes is offered and the maximum number can set to nine. Numbers can be displayed if required and the four skill levels affect the time and the number of mistakes allowed before the game is brought to an end. 'Helpful Herbert' must be guided to pick up the correct fruits and place them in the correct spaces to complete a sequence.



Tidy reinforces gender stereotyping – but it's still fun

Simple and fun – my four year old managed it perfectly. *Burger Boy* has a much wider range of variables and can include money additions in pounds or pence or both. A rather rough character appears in the shop and makes his request in both text and speech. The child must select each of the required items displayed on the shelves which 'Helpful Herbert' places on the counter. At the conclusion the individual costs must be totalled before the customer eats everything ordered, burps and retires.

Tidy is an altogether different program which is excellent for practising those prepositional statements like "put it on, under, behind, in front of". The number of prepositions can be controlled, as can adjectives like 'big', 'small', 'long', 'short' and so on.

Young Emma gives, in speech and text, instructions as to where each of her toys must be placed. By guiding her pet parrot with the mouse the child's task is to pick up each item and place it in its correct location. The six skill levels control the number of instructions given at one time.

I experienced problems with sound on my A5000, although H.S. Software assures me that all the programs run successfully on both it and the A540. On the A3000 and A300/400 series, I experienced no problems at all. However, there are one or two warts: the customer's grammar is less than perfect in *Burger Boy* and in *Coconuts*, pineapples are shown growing in palm trees! However, H.S. is doing what it can to rectify these.

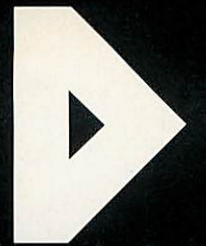
The only other element I felt to be missing from all these educational and entertaining games is the ability to monitor childrens' responses while they are using each program. This would provide a teacher with a useful assessment of a child's performance and help to highlight areas which might need further work. Still, in the home situation this is of secondary importance.

Eight or nine year olds definitely vote *Burger Boy* as a winner, while I think *Tidy* is of most value in language development and especially pertinent to infant and special schools. *Fun & Games* represents excellent value for money, finding a useful niche in most infant departments, but it is also ideally suited for home use.

PRODUCT DETAILS

Product: Fun & Games
Supplier: H.S. Software, 56 Hendrefoilan Avenue, Sketty, Swansea, SA2 7NB
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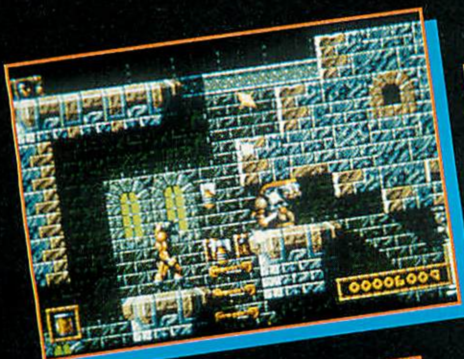


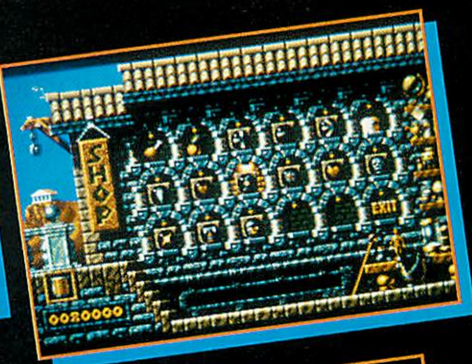





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VECTORED THRUST

Rob Miller looks at Vector, a 32-bit design package that promises to overcome all the limitations of Draw

Anyone who owns an Archimedes computer will be familiar with *Draw*, Acorn's object-oriented design package. Although it is an excellent piece of software, there are still a few areas where things could be improved.

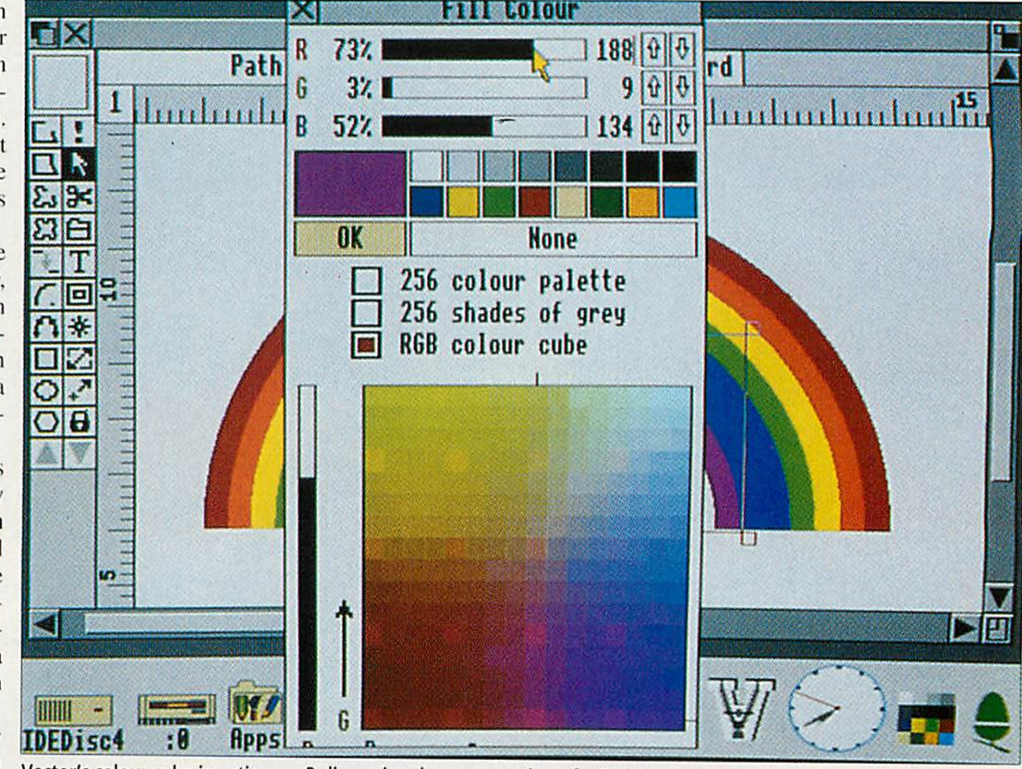
4Mation has therefore decided to release *Vector*, which draws its ideas from Acorn's original program. Virtually every aspect has been enhanced or revised and a number of new tools and features added.

Desktop publishing is becoming an increasingly popular pursuit, particularly on 32-bit computers. Up until now, the only real package enabling you to create 'line-art' has been *Draw*, so a program such as *Vector* is a welcome addition to the Acorn market.

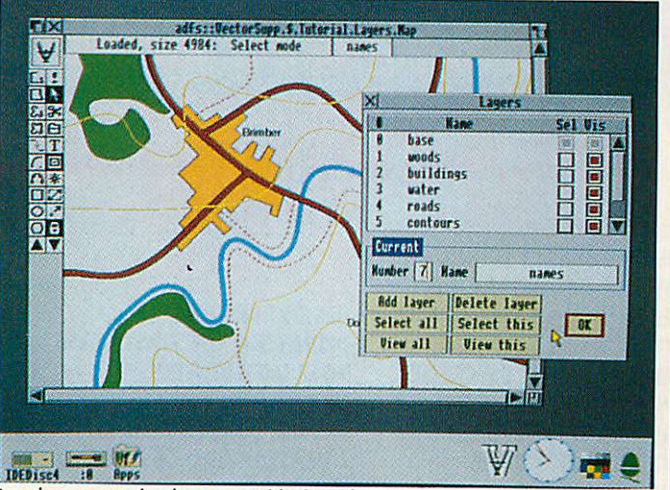
Although *Vector* effectively duplicates the tools found in *Draw* and the way in which they are executed, the addition of new features puts it into a niche of its own.

Like *Draw*, *Vector* is an object-orientated design program. That is, it can be used to create pictures which are made up of lines and shapes, any of which can be individually edited. Because all lines and shapes are stored as coordnates, transformations such as rotating, squashing and stretching are very easy to achieve. Duplicating single (or groups of) lines or shapes is also simple.

The way in which pictures are stored also means that the



Vector's colour cube in action – a 3-dimensional representation of a 24-bit palette



Drawing maps using layers – an ideal use for Vector

COMPATIBILITY

It's quite obvious that *Vector* relies quite a lot on the extra features of Risc Os 3. It's not essential to have it – there are still a lot of tools that will work quite happily under the older operating system, such as masking, replication and radiation.

You can use the Risc Os 3-only bits by replacing the relevant Risc Os modules with new ones, although Acorn has no plans to release them separately from Risc Os 3. Anyone with an A5000 will already have Risc Os 3, and it should be available to other Archimedes users very soon.

quality of hard copy – reproducing the picture on paper or film – is only limited by the printer. A lot of the design work you see in magazines and newspapers will probably have been produced on an object-oriented system such as *Vector*.

At present, the only other Archimedes package that will allow you to create *Draw* files is Computer Concepts' *Artworks*. In theory, the two programs could be compared, although in reality, each is aimed at a completely different user.

MORE IS BETTER

Vector is effectively an enhanced *Draw*, with a selection of additional tools and features. Pictures can be created from four basic items; straight lines, curved lines, enclosed straight lines (rectangles) and enclosed curved lines (ellipses). As in *Draw*, lines can be any colour and any thickness.

On loading *Vector*, an icon appears on the icon bar, which in turn brings up the main *Vector* window. All drawing tools can be accessed from a small toolbox which forms part of the main window. A status box and rulers can also be added to the window by configuring the relevant preference settings (in much the same way as in Computer Concepts' *Impression* DTP program).

The tool box is divided into two parts; the left hand containing all the tools that create lines/shapes, and the right side containing editing tools and general features.

Although the tools in *Vector* are similar to those in *Draw*, the way in which they are implemented differs in places. For example, where one would normally use the Adjust (right-hand) mouse button to complete a path, *Vector* inserts an extra point, which takes some getting used to.

COLOUR SELECTION

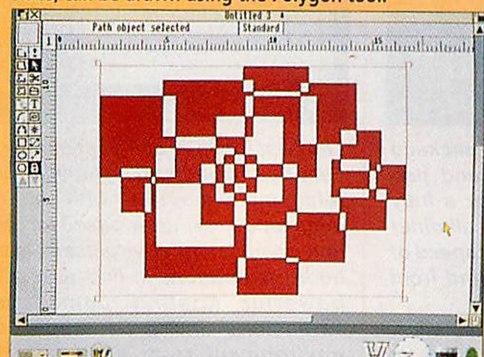
Like *Draw*, *Vector* allows full 24-bit colour to be used for shapes and lines. That is, they can be any colour from a selection of 16,777,216. The current 32-bit hardware is only capable of displaying 256 colours, so dithering is used to represent the extra shades.

NEW TOOLS

Vector will 'generate' all the necessary curves needed to form a perfect arc, with the user just indicating the centre of the circle and the beginning and end points of the line.

Curves can be defined by using four points to show where the line should pass through. This is particularly useful when you want to draw a curve that fits closely around another object.

Regular polygons, with anything from 3 to 100 sides, can be drawn using the Polygon tool.



Although it is a simple concept, the new Merge Paths tool opens up a wide range of possibilities when used with other features. Merging a number of objects together literally makes all the lines into one path, with moves being inserted where required.

Holes can be placed inside existing shapes by just merging the two togther and text-shaped masks can be created simply. The only disadvantage when combining shapes is that they become one and so they can be only one colour.

One of the more time-consuming activities when drawing pictures is trying to locate items of clip art for possible inclusion. *Vector* allows libraries of separate drawings to be built up and saved separately as compressed library files.

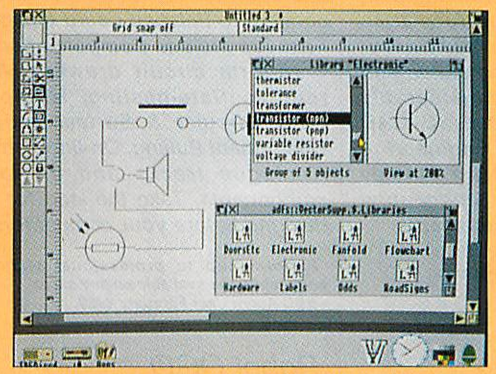
Libraries are particularly useful when you want to build up a picture from smaller, pre-defined pictures, for example, designing a circuit diagram. A number of libraries, including component symbols, are included with *Vector*.

Levels are already present in *Draw*, but *Vector* goes a stage further, by allowing you to create individually named layers. Up to 32 layers can be defined, and they can be displayed independently of each other.

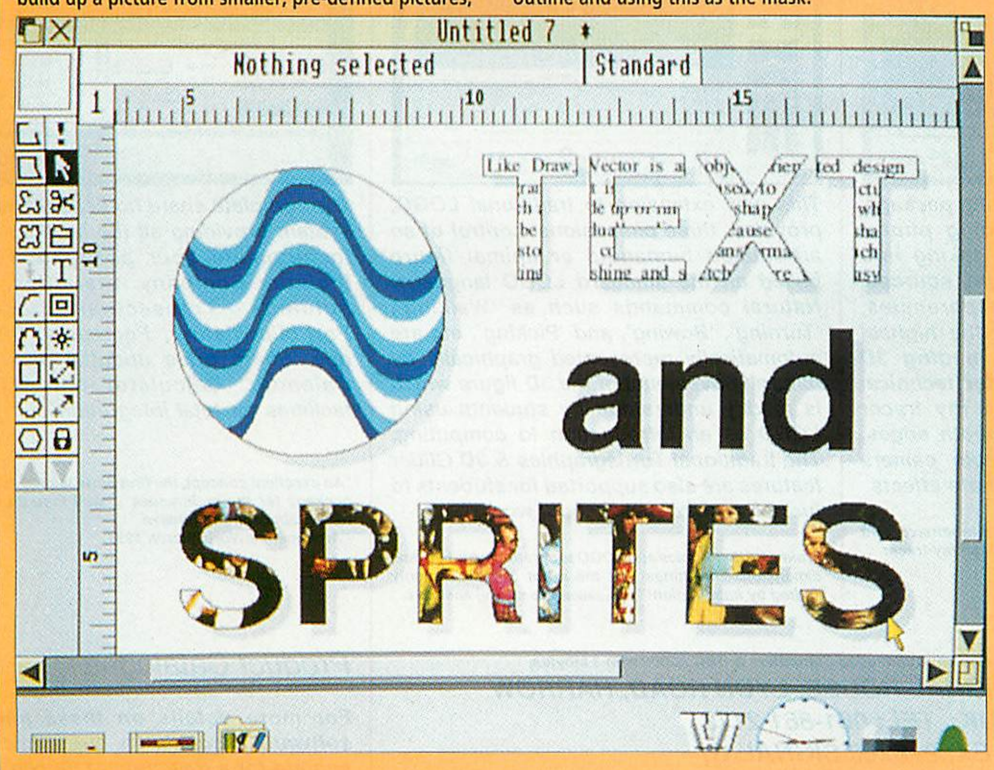
Complex drawings can be built up in a modular way by designing one layer at a time. Because layers can be viewed separately, the time taken to redraw the screen is kept to a minimum.

A particularly good use for layers is in the creation of a map. The different features such as A-roads, B-roads, contour lines and so on, can be displayed separately, together, or in different combinations, rather like adding acetates to an overhead projection.

Masking is a concept unique to *Vector*, allowing a number of effects that are impossible to achieve in any other package. A mask is simply any shape that is used as a 'window' onto any object or objects.



An object can consist of anything allowed in *Draw*, including Sprites and/or Text Areas. Because a mask has no colour, it's possible to add effects such as shadowing. Text can be filled with any *Draw*-object by converting it to a path, merging the letters into one outline and using this as the mask.



REPLICATION AND RADIATION

When copying objects in *Draw*, files can quite quickly become big and take up a lot of memory. *Vector* solves this problem with its Replication tool. A 'master' object must first be created, from which replicas can be made. When saving a file, all that is stored is the original master object, plus a series of 'tokens' where the replicas would be.

The replica objects can be either static, where they are just copies of the original, or dynamic, where they change when the master is changed. Replicas can also be a different size to the master object and will be scaled up or down accordingly.

As well as saving space, an ideal use for the Replicate tool is the printing of labels. Only one label need be designed and that design can then be copied across a page. In addition, changes can be made to the original design and all the replicas you have created will be altered at once.

Radiation has been specially designed to allow one to create circular 'spirograph-type' patterns from any shape. Shapes can be rotated around any one of nine points (top-left, top-middle, top-right etc.) and a dialogue box allows easy selction of this using a three by three grid of 'radio' buttons.

Any number of steps can be defined – *Vector* calculates the angle for each step in order to ensure that the finished item fills 360 degrees. Shapes can be rotated either clockwise or anticlockwise.

Like Replicate, Radiate only stores the original shape. All that are need to generate the radiation are the number of steps and the angle of each step. These are saved as part of the *Vector* file.

This option is only available when running *Vector* under Risc Os 3 (currently only fitted in the A5000).

As well as selecting colours using slider bars (as in *Draw*), *Vector* allows uses a colour cube; a 3-dimensional representation of the 24-bit palette. Each unit in the cube holds a certain amount of red, green and blue (between 0 and 255), with an empty unit being black and a full unit being white (ie. 255 parts each of red, green and blue).

GRID LOCK

Vector improves upon *Draw*'s grid features in a number of ways. First, it is possible to turn the grid on or off by just clicking on the toolbox, even during the middle of drawing a line or shape. Any one of four different grids can be selected at any one time, using centimetres, millimetres, inches or points.

Horizontal and vertical rulers can be toggled on or off, and these show the position of the pointer by means off small markers. When the ratio of a grid is changed, the rulers are altered accordingly, making it easy to draw accurate pictures without having to keep counting grid spaces (as one would in *Draw*).

TEXT HANDLING

Text manipulation is an area where *Vector* excels. Not only can text be edited once it has been typed in (not possible in *Draw*), it can be italicised by shearing.

Kerning – reducing the space between letters to improve the appearance – can be applied to any text that has been written using Risc Os 3 fonts. Note that, in fact, all the text manipulation tools, apart from simple editing, are only available when using Risc Os 3.

LEARNING THE TRICKS

Because there are so many features, the learning curve in *Vector* is quite steep, and users familiar with *Draw* may take a little time getting used to the slightly different way in which *Vector*'s tools are presented and operate.

The inclusion of a status box – which is always present on screen – helps matters as it gives a constant report on what tool is being used and what it's doing. *Vector* is also one of those programs that's fun to use; trying out different ideas is an excellent way of 'learning the ropes'.

The manual is extremely well laid out, in full colour, with plenty of examples to illustrate the new tools and concepts. A supplementary disc also contains a number of the examples used in the manual so you can get the program up and running immediately.

Anyone who uses *Draw* should take a look at *Vector*. Its extra features make it ideal for all sorts of applications, from technical drawing, to graphic design and even limited desktop publishing. Because of its versatility, *Vector* is a program that would be equally at home in the classroom, design studio or, indeed, in the home.

The complete package (including two discs, the manual and a full site licence) is only £99.88 (inc. VAT) which represents excellent value for such a useful piece of software.

A demonstration disc is available from 4Mation which features a fully working copy of *Vector*, minus the saving and printing facilities, for those who wish to try before they buy.

PRINTING

Although *Vector* uses Risc Os printer drivers, a number of extensions provide a more flexible system than would otherwise be possible. If a document is larger than the printer driver page size, it can be printed over two or more pieces of paper.

Documents can be scaled up or down, and horizontal and vertical offsets can be given to move where the document is printed on paper.

All printers that work with Risc Os printer drivers can be used with *Vector*. If you're using rotated text though, you must be sure to use a Risc Os 3 printer driver.

PRODUCT DETAILS

Product: Vector
Supplier: 4Mation, 14 Castle Park Road, Barnstable, Devon EX32 8PA Tel: (0271) 25353
Price: £99.88



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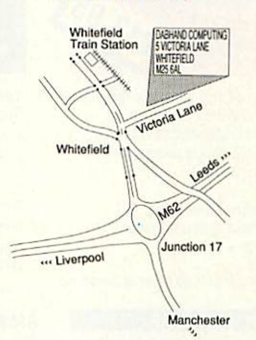
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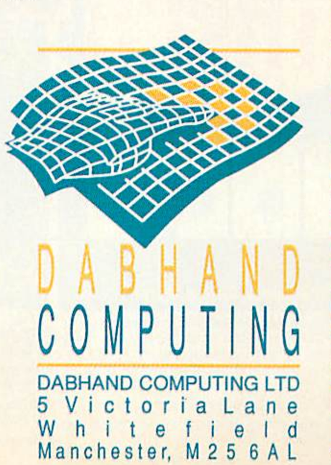


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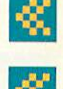


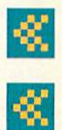


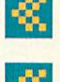
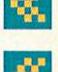

















SITUATIONS VACANT

The Acorn market is full of product innovation, but there are holes to be filled. Arthur King looks at some of the successes and prepares a wish list

The future of the Archimedes will depend just as heavily on the improvement in quality and range of third-party hardware and software products as Acorn's continuing development of the machine itself.

The Archimedes has spawned a wide selection of innovative products to which users have enjoyed exclusive access, and the days when choice was basic and minimal are long gone. There have been success stories, some of which are belatedly appearing on other platforms, but there are products not yet available on the Archimedes which are now taken for granted by Mac and PC users.

MAKING PROGRESS . . .

People who have never before crossed paths with an Archimedes are stunned by a demonstration of direct drive laser printing using either the ARCLaser system from Calligraph, or the LaserDirect from Computer Concepts. The effect is heightened when demonstrated with software optimised for direct drive printing, like Computer Concepts' *Impression* DTP package.

On a PC or Apple Mac, you simply can't match the ability of these systems to produce finished pages containing complex text and graphic layouts in a matter of a couple of minutes, without spending a comparatively huge amount of money.

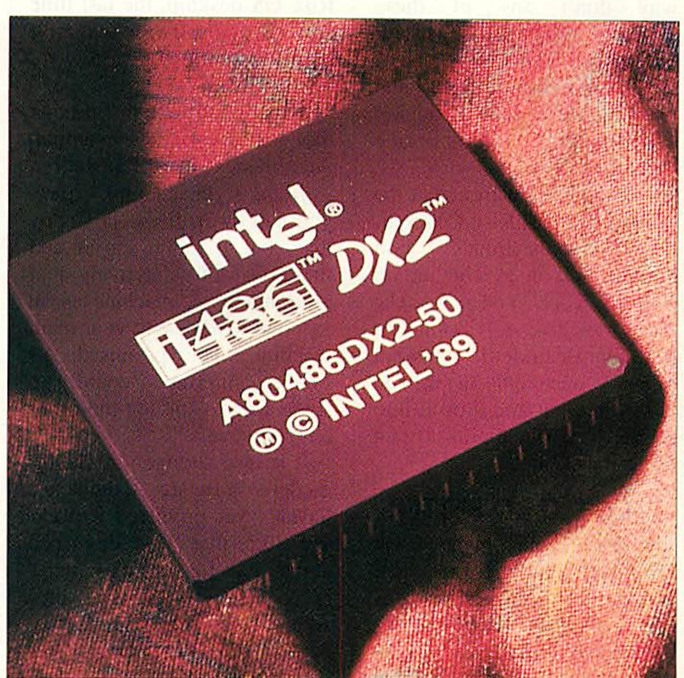
Direct drive laser solutions with print resolutions up to a pseudo-600dpi are available to Archimedes users for under £1000. PC and Mac users have to make do with much slower laser printers which can only offer 300dpi resolution and many of these cost more than a grand. If you want something that matches the speed and resolution of Archimedes direct drive printing, be prepared to pay.

For example, QMS supplies 600dpi PostScript laser printers, but one of these on its own would cost enough to pay for a hefty chunk of an entire Acorn Publishing System outfit, which includes an A540 computer, flat-bed scanner, pseudo-600dpi LaserDirect laser printer and *Impression* software. It is a similar story if a PC or Mac owner considers a LaserMaster system offering specifications to match the best Archimedes direct drive printer systems.

History has shown that key products have endowed certain platforms with great success; the original Apple II was boosted by the first spreadsheet package, *Visicalc*. DTP and graphics have similarly sold a lot of Apple Macs. Meanwhile, *Lotus 1-2-3* is reckoned to have sold more than a few IBM PC-compatibles. LaserDirect and ARClaser are certainly responsible for a huge proportion of Archimedes' sales.

When the Archimedes was launched five years ago, the speed of its innovative 8MHz Arm2 Risc processor was headline news. Today, that same processor still compares well with the more affordable PC and Macintosh models, but Archimedes users have come to expect a lot more of their machines, so when Acorn announced versions of the chip that could run at up to 30MHz, everyone wanted one.

Many electronic engineers are Archimedes users and it wasn't long before their expertise was channelled into grafting Arm3 power into machines which were only ever designed to accept the original Arm2 chip. Enter the now ubiquitous Arm3 upgrade, which thousands of A300, A400 and now even A3000 users have installed, extending the useful range of their computers.



Intel's DX2: the very latest in PC speed – but no match for the Arm3

When the Arc first appeared, the bread and butter PC had an 8086 processor in it. Since then the 80286, the 80386 and now the 80486 chips have spewed forth from Intel. That adds up to as many as three changes of PC since the Archimedes was launched. Even now, only the 486 has proved to be significantly faster than the original Archimedes and the latest Acorn A540 and A5000 models offer 486-league performance.

Perhaps someone at Intel came across an Arm3 upgrade, who knows? But it is interesting to see that Intel has introduced something very similar to the Arm3 upgrade – the Intel 486DX2. Like an Arm3 upgrade, the 486DX2 has an internal cache memory which enables it to be clocked faster than the host machine's original processor.

The DX2 almost doubles the speed of the original chip – a modest improvement compared to an Arm3 upgrade, which usually offers an improvement of between three and five times in speed. The Intel DX2 is great news for PC owners, who now no longer need worry about built-in

obsolescence, but then again, DX2 upgrades won't be available until later this year.

The PC world is currently in awe of *Microsoft Windows* and, while Apple Mac users have always enjoyed the benefits of an operating system with an intuitive graphical user interface (GUI), I still wonder why even the latest versions of either of these GUIs still haven't cottoned on to some of the simple yet crucial features of Risc OS on the Archimedes.

It is perfectly fair to say that, as a long-time Archimedes user, I'm bound to be a bit biased, and it's also perfectly fair to add that Mac System 7 and *Microsoft Windows 3.1* all offer very powerful facilities which have yet to be included in Risc OS. But why don't any of these systems offer a consistent method of file manipulation which offers the simplicity and convenience of icon 'dragging and dropping' to the degree that Risc OS allows?

This single feature can be exploited by all Risc OS compliant applications. You double click on an icon and up pop file icons. You can make them look like a *Windows* or Mac filer or finder if you want to, but you can only lift the file icon you want and drop it into another application's icon using Risc OS.

... COULD DO BETTER

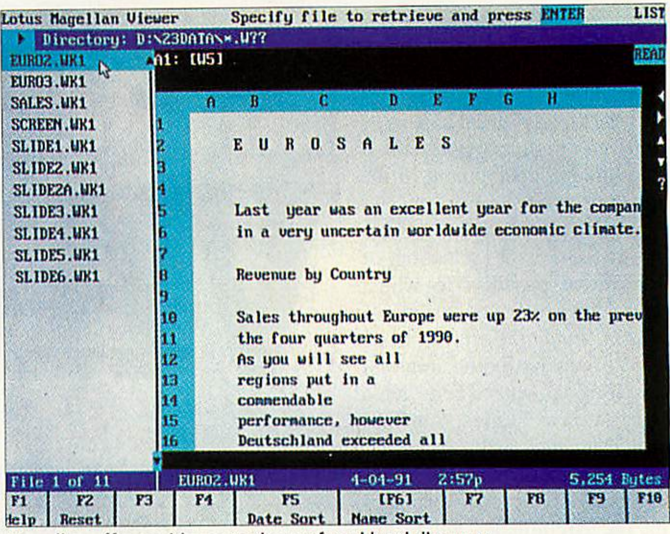
The recent boom in notebook PCs, including the first such version of the Archimedes launched this month, plus heightened interest in pocket computers like Apple's new Newton, also revealed this month, is indicative of the demand for mobile computing.

Accumulated data which needs transferring to a desk-bound computer back at the office (and increasingly at home) has generated a healthy industry for optimised file transfer packages, currently dominated by Traveling Software's *LapLink* package. These offer very fast data transfer rates.

Currently, there is nothing really like this on the Archimedes. Colton Software's *Pipedream* spreadsheet/word-processor package does offer a primitive system which lets an Archimedes user interrogate a Z88 portable computer and transfer files, but while it makes reasonable use of the Risc OS desktop, the last time I used it the software was a bit buggy and file transfers were very slow.

It was a surprise to find that the new Acorn A4 notebook Archimedes doesn't include a *LapLink*-style facility. Sure, you can swap files via floppy disc, but it is far easier and more useful to effectively treat your notebook machine as an external hard disc to your main machine. The promised A4 Econet interface could go some way to solving the problem, however.

It is also strange that Archimedes software companies haven't yet produced a package like that I've described above but for ordinary notebook PCs, especially since Acorn has worked so hard to perfect the *PC Emulator* for owners who also use PCs. Personally, I use a Psion MC400 portable computer which has a proprietary operating system. An intelligent file transfer and interrogation/remote control facility for my MC400 – which I know many other Archimedes users also own – would be very useful!



Magellan offers guidance to the confused hard disc user

FINDING THE WAY

About five years ago, Lotus Development, which is best known for the *1-2-3* PC spreadsheet, produced an interesting free format database package called *Magellan*. The 15th century Spanish explorer's name was associated with Lotus' product via the tenuous link that both were navigators, the PC one enabling a user to navigate around the indexed contents of his or her PC's hard disc.

Magellan compiles a massive index of the entire contents of a PC hard disc. This process can be done after a days's work as if there have been many changes made to files stored, the indexing process can take a while. However, the end result is that you have a near-instant searching facility which can locate and list any files which contain specified search data, like a word or phrase for example.

Magellan can launch templates which are dummy application environments relating to the application which originally produced the target file. If your target document is a *WordStar* document, up pops what looks like *WordStar* on the screen, complete with your document text, except you can't edit it.

You can see what a boon something like *Magellan* would be to us journalists, but it would find great favour among any computer user who has to soft through a modicum of text and other files which might not be easily filed in a conventional database.

Forgive me if I'm in error, but I have yet to see any project management packages for the Archimedes. These programs are designed to accumulate data concerning the collective progress of the various tasks which are scheduled and make up an overall project.

Project management is a very trendy development in PC and Macintosh business software, but I'd have thought there was plenty of scope for project management in traditional Archimedes territory, like schools.

Some final ideas; character recognition software to do justice to the Archimedes' excellent selection of image scanners, and software to exploit the latest generation of very fast combined data and fax modems and 100Kbps+ serial port upgrades. I believe that some of these may be under development for the Archimedes already, but they're certainly keeping a low profile and meanwhile they are freely available to both PC and Macintosh users.

If you have any pet ideas for hardware or software products you've seen on other computers, drop us a line and perhaps we'll see if we can persuade Archimedes developers to come up with the goods.

Laplink: a fast comms package that Arc users should covet

SCANNING IS BELIEVING

The ScanLight range of scanners has become the most popular for the Archimedes. We now introduce a new updated version of ScanLight 256, a true 256 greyscale hand held scanner, along with new scanner software and a new low price.

The ScanLight, version 2 software, now offers;

- Instant image rotation by any angle
- Support for the new RISC OS 3 true 256 grey-level sprite format
- Only one copy of the image in memory at once
- On the fly screen-dithering for maximum quality
- A selection of sampling sizes from 2x2 to 8x8
- Image enhancement facilities such as sharpening, edge detect etc.
- Simple brightness and contrast controls
- Spline curve control over grey-map for additional control

The scanner itself now offers a maximum resolution of 400 dpi true 256 grey-levels at full 105mm width. In addition there is support for monochrome, 16 grey-level and 256 grey-level scanning at 100, 200, 300 and 400 dpi. The ScanLight software offers several unique facilities that make it the leader in its field - e.g. the ability to provide all picture processing and enhancement functions with only the one original copy of the image in memory - vital since scanned pictures require a great deal of memory.

The perfect way to capture high quality pictures for inclusion in DTP or practically any other RISC OS application.

ScanLight 256, scanner, interface board and software- £199.00+VAT (£233.92 inc.)

Suitable for all Archimedes models and Operating System versions. An internal A3000 version is available for the same price. Please specify when ordering.



- New software
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GAME SHOW

Wing Commander has been out on PC-compatible computers for a few years now and is highly regarded as a classic space shoot-'em-up, largely because of its superbly detailed and colourful graphics and the smoothness and speed of the gameplay. We can now reveal that, around autumn, if luck prevails, we should be seeing an Acorn version of the game from the original publisher, Mindscape.

Wing Commander has many resemblances to *Elite,* in that you fly around in 3D space shooting at other ships but it doesn't have the trading element. The story is quite simple. The ruthless and evil Kilrathi aliens have decided to rid the galaxy of human life.

As a hot-shot fresh from Space Academy you don uniform, hop into the latest super-duper fighter and blast off to save the worlds and become a hero, with your trusted wing-man alongside. In between missions you can hang out in the bar.

On the subject of conversions, Krisalis has begun work on a Risc OS version of *Sim City*, originally from Superior Software and one of the best games for the BBC Micro.

In *Sim City* you become the chief planner and mayor of a piece of wasteland and are given money and resources to build it up into a buzzing, thriving city. By classifying areas as residential, industrial or business zones, building road links, power stations and setting a reasonable tax rate, among other things, your development should attract an eager and honest population.

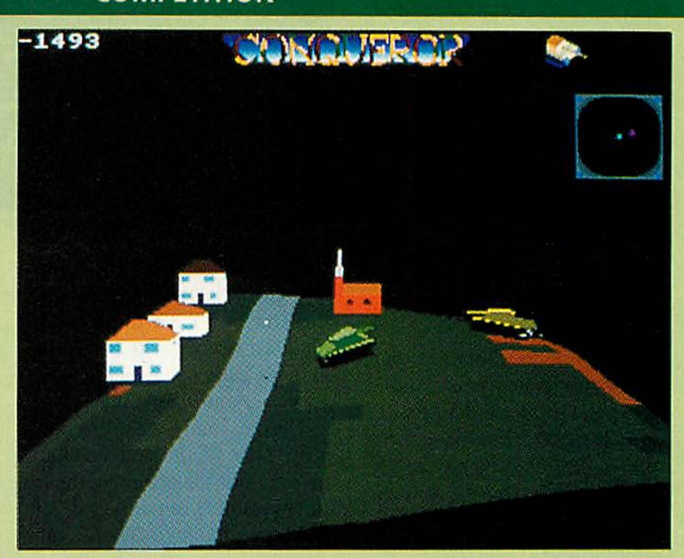
This will grow as time goes by and make you proud to be a mayor. Alternatively, if you're a nasty piece of work, you can be a little despot, treat your citizens like dirt and become public enemy number one – whatever gives you the greatest kick!

COMPETITION

As reported in Game Show a few months ago, Superior Software is to relaunch its highly successful *Play It Again Sam* series, but this time on the Archimedes, A3000 and A5000 machines. The series appears to have been so popular as a result of a winning formula adopted by Superior Software: bundle an old Superior 'classic', two other 'golden oldies' and often a brand new game to boot, all for the price of one. The first *Play It Again Sam* for Risc OS machines will contain four games: *Conqueror, Hostages, Rotor* and *No Excuses.*

Conqueror was the second game ever to be released for the Archimedes computer and, despite looking rather similar to game-number-one *Zarch*, I thought it was extremely playable and addictive. The idea in *Conqueror* is to drive tanks around a three dimensional patchwork landscape blasting the turrets off the enemy and staying alive long enough to upgrade to a better model.

Hostages is another Superior Software game, now almost two years old, in which a bunch of French terrorists have taken control of an embassy in Paris containing a few fat hostages and a labyrinth of corridors. Before storming the building you, as SAS paratrooper extraordinaire, have to break clear of the terrorists' sniper fire and rescue the hostages by running, rolling, somersaulting and performing other acrobatic manoeuvres.



The remaining two games on the compilation are *Rotor* and *No Excuses*, both from Arcana. *Rotor* is a space exploration adventure in which you pilot a round rotatable space ship through a maze, blasting wall-mounted flak guns and collecting bonuses along the way.

No Excuses places you on a strange isometric grid attempting to shoot funny flying things out of the sky and stay alive.

So what do you need to do to win a copy of this compilation? Simple. Just answer two easy questions and then give us the names of four Archimedes/A3000/A5000 games you would like to see re-released as part of a future *Play It Again Sam* compilation.

ENTRY FORM

1. From which film is the saying 'Play it again Sam' originally said to derive?

2. Which four games made up the very First Play It Again Sam compilation on the BBC Micro?

Send your ideas for a new compilation, with the answers to these questions, on a postcard or the back of an envelope to: The Sam Competition, BBC Acorn User, 101 Bayham Street, London NW1 0AG, by 13th August 1992. The first five correct answers out of the hat will win copies of *Play It Again Sam 1* from Superior Software. The editor's decision is final.

Sim City will be essentially the same as the BBC version but with better graphics and better sound and, if all goes well, it will work inside a window in the Risc OS desktop environment.

Anyone still stuck on *Lemmings* from Krisalis will be pleased to know that a simple password will provide access to all the levels in the game. Natalie Runnicles, from Wellingborough, sent in the cheat code word IAMNOTGOOD, describing it as the 'ideal cheat for impatient sadists', since you only have to press the space bar to skip the level if too many of the critters have been squashed, crunched, drowned or splattered for there to remain any possibility of successfully completing it. A hundred extra screens for *Lemmings*, called *Oh No, More Lemmings!*, will be released by Krisalis shortly.

Attention all fans of that psychedelic hippy platforms game *Top Banana* from Hex, in which you have to save the planet from ecological disaster by using love hearts to combat weirdo freaks in flooding rainforests. Michael and Chris Hayles of Coventry have sent in word of the built-in cheat.

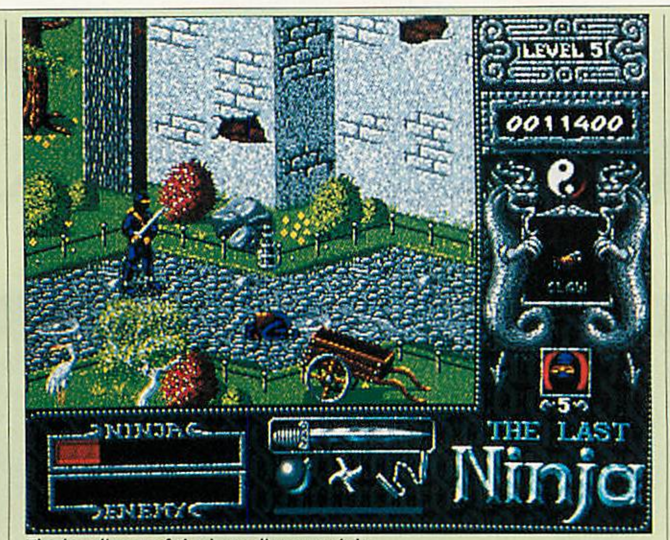
During the title sequence, when the video track and music are playing, type in BANANA and then either 1, 2, 3 or 4 to specify the world where you wish to start – deceptively simple really!

THE LAST NINJA

Superior Software.
Tel: (0652) 658585
Risc OS machines
£24.95

The *Last Ninja* is not a new game – it has made an appearance on just about every home micro, including the BBC, over the past few years and its sequel has likewise made the rounds. And, better late than never, this amazingly popular and highly rated game has finally made it to the Acorn 32-bit world.

'Ninja is not just a beat-em-up, as there are about 150 locations set over four levels, more appropriately called areas, that move the game into the realms of an arcade adventure. Graphics are isometric, so you move between locations diagonally, and the very pretty backdrops give a good feeling of 'depth' to the game. Some screens contain baddies, some don't. Some contain weapons and others are full of useful objects. Needless to say, the baddies must be beaten up and the other objects picked up. But don't get these muddled as beating up a flower and picking up a baddie can carry very stiff sentences!



The loneliness of the long-distance ninja

Unlike many beat-em-ups, with *Last Ninja* you need to be an ambidextrous octopus to execute your arsenal of Ninjitsu moves. There are simply two attacking and two defensive moves invoked with the normal movement keys and 'fire'. Weapons can be used against enemies and you'll fare better if you use the same weapon as your opponent. This becomes very important in later levels.

The objects you find must be used to solve the various puzzles dotted about the game. Apart from the two or three occasions when you have to use 'Ninja Magic', the puzzles are all quite straightforward.

I played through the whole game, armed with the comprehensive cheat mode, and apart from one bug that Superior is now aware of, and one dodgy sprite, I was suitably impressed. If you're not into combat games, I doubt if you'll get on with *'Ninja,* but fans of games like *Way of the Exploding Fist* or *Barbarian* should feel right at home.

If you're not sure of your allegiances, then give the first level, designed to be a 'training' round, a try, and see what you think. First of all, I found jumping across the rivers to be quite tricky to master, but it turned out that all I needed was a little practice.

My only real criticism happens when you move between screens: no matter where you are on the path in one screen, you are repositioned in the centre in the next – hardly a case for not buying the game though! The only question that still niggles me is, if you really are 'the last Ninja' why do all the baddies look like you and fight like you?

Dave Lawrence

GODS

Krisalis
Tel: (0709) 372290
Risc OS machines
£ 25.99

What could be more appropriate, on an Archimedes, than a game set in the world of Greek mythology? *Gods* is pretty well the definitive ladders and platforms game, and places you in the sandals of an aspiring young hero who must work his way through a number of levels to join the gods themselves.

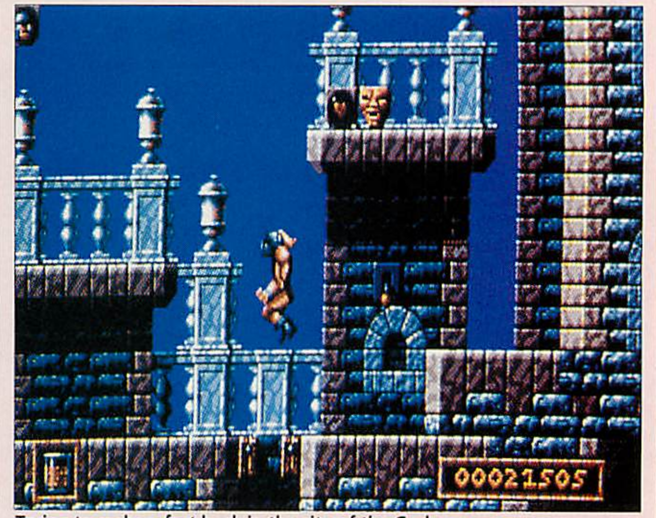
Starting off in the city, your warrior is unarmed and relatively harmless, though collecting objects such as weapons, potions and treasure helps to increase his strength and stamina. This allows him to progress more easily through the game. The objects can also be bought from a friendly shopkeeper who occasionally appears, as if by magic, along the way.

A whole range of arms, from weedy daggers to rather fearsome axes, can be purchased, once you've collected money in the form of gold plates, jewels and the like. As well as weapons, you can buy potions to boost your strength or energy. It's even possible to buy extra lives, if you have enough money.

Gods is set over four levels and each consists of several parts. After each part has been suitably completed a count is made of the number of lives left and a bonus score awarded. At the end of each level a password is displayed so that you don't have to go through everything again.

Completing the earlier parts of level one is a relatively simple task, designed to introduce you to the various characters and the ways in which to destroy them. Killers will walk along platforms blocking your way and occasionally shooting at you. Flyers are the same as killers but can avoid your shots by taking to the air at the crucial moment. Thieves will also kill but prefer to steal any items you may be carrying.

The graphics in *Gods*, like the game play, are just short of perfect. Although a 16-colour mode is used, the quality and detail are excellent. A lot of shading is used to give a three-dimensional look to the display, with flickering torches and cast shadows helping to add to the effect.All animation is smooth and detailed with the warrior's muscles flexing as he ambles around the different levels.



Trying to make a fast buck in the city of the Gods

Sound is perhaps not quite as good; sound effects are short but functional, such as the creaking of a door opening somewhere.

The Bitmap Brothers, the original authors of *Gods*, are often recognised as masters in their field. Let's hope it's not too long before we see more conversions, like this one, of their most excellent programs to Acorn machines. Full marks to Krisalis for another superb game.

Rob Miller

QUEST FOR GOLD

Krisalis
Tel: (0709) 372290
Risc OS machines
£25.99

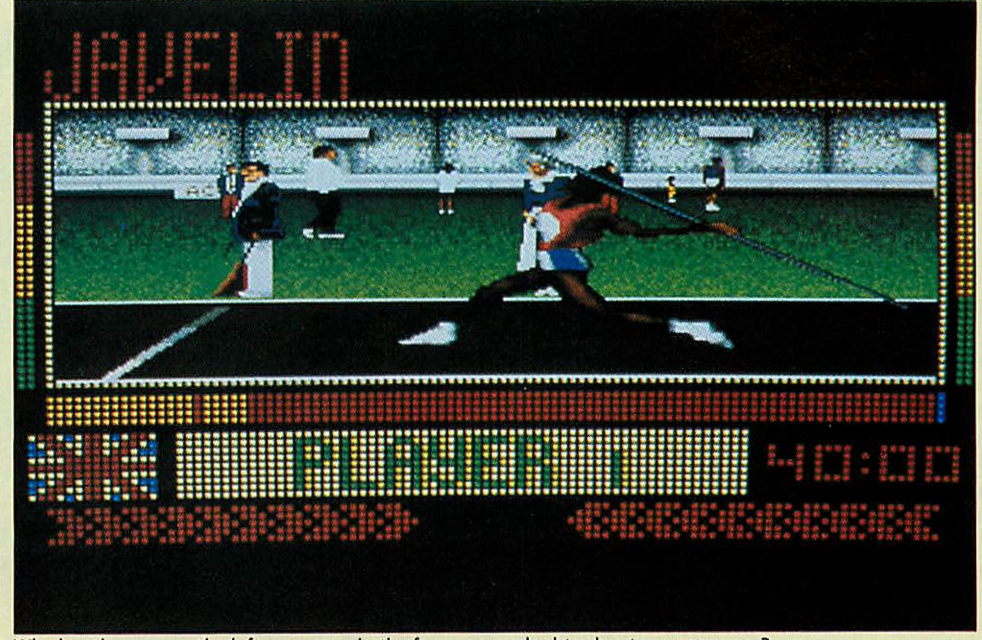
Barcelona '92 is all set to begin and everybody else is all set for Barcelona, including the Acorn computer world and Krisalis Software, with its new game, *Quest for Gold.* Combining management and arcade sections, *Quest for Gold* is a game for up to four players in which five events are simulated: 100m sprint, 110m hurdles, javelin, high jump and the long jump.

Most people will want to play the arcade part of the game before trying their hand at the training aspect and the first thing to do is choose a country for each of the competing players.

The events themselves are all played by using the mouse or a joystick, confirming the publisher's claim that no 'keyboard bashing' takes place in *Quest for Gold.* By oscillating the mouse vigorously from side to side you make your athlete run, and by clicking on a mouse button they will leap, throw, jump, flip or whatever when this is deemed necessary.

If you consider 'mouse wiggling' to be no less harsh on your computer equipment than keyboard bashing you will be pleased to learn that another method of controlling the athletes is also available. In rhythm mode your athlete's speed depends on how well your mouse clicks keep to the tempo of a linear pendulum.

The 100m sprint and the 110m hurdle races are viewed from a sideways and slightly raised position so all four runners can be seen. A digitised voice announces 'on your marks, get set, go', a little man fires his starting pistol and then it is just a case of wiggling the mouse as energetically as possible until the race ends. As the contest takes place, your athlete wears a flashing arrow over his head so you can tell which of the four runners is yours.



Why has the man on the left gone grey in the face – some doubts about your accuracy?

The idea is to beat not the other athletes but the clock, completing the course in successively shorter times. In multi-player mode the last player to compete will race alongside a replay of the previous competitors' efforts. But while this can be hunky dory for the final player it certainly puts the first players – who race only the computer characters – at a distinct psychological disadvantage.

The javelin event is again viewed from the side and again some serious mouse wiggling is in order to bring the athlete (a digitised Fatima Whitbread) up to speed. This event has the best animation while the complex throw sequence is carried out, then the action freezes for the rough angle of elevation to be chosen using the mouse. The view then changes, in a rare departure from the sideways position, to an – albeit tiny – isometric perspective.

The high jump and long jump require further use of mouse wiggling techniques with the odd click, skip and a jump to make it more exciting.

The arcade section has fabulously well animated graphics because the large and detailed athletes are actually digitised from video footage taken at the last Olympics. In a sense, however, there is nothing particularly innovative in this approach: I would have liked to watch the athletes compete from other viewpoints instead of always from the side.

In the management part of the game there are a lot of numbers and funny words like 'isometrics' and 'isotronics'. Essentially, each athlete is rated according to agility, speed, power and stamina and you stipulate a range of exercises to be undertaken by each athlete each week, for each player. You have five weeks to carry out a constructive programme of training and may use the mouse to adjust the frequency, intensity and time spent on activities such as circuit training, running and 'aerobic endurance' tests.

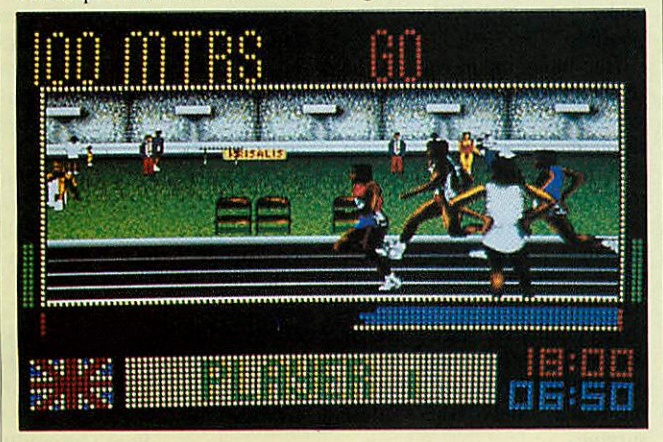
A helpful section in the manual gives tips on which exercises to use and when, while an assortment of graphs and charts in the game are used to show how your athletes are responding to the training. After training has been completed, athletes must be chosen for the events themselves.

The management and arcade parts can be played separately but to have a chance of breaking a world record it is necessary to play the full simulation.

Quest for Gold is fun. The training of the athletes is made enjoyable by the knowledge that it really does have an effect on the way you compete. But after the initial excitement of my first few games familiarity settled in quickly and I began to run short of new things to try.

Played, however, with some friends, the element of competition springs suddenly to life and the game can be very entertaining. What has been done with *Quest for Gold* is good but I don't think it is likely to attract much sustained attention, instead being the sort of game you play for a week or two then shelve until a rainy day.

Sam Greenhill



BACK IN THE GAME

Famous people can look forward to at least two occasions in their lives on which to expect a loud trumpeting of their achievements by the media: when they retire and when they die. In between times, things can all too often be rather dull once the public spotlight has shifted its unthoughtful glare to a more newsworthy target.

But not Fatima Whitbread, the burly British athlete who is the current holder of the Olympic silver medal for javelin throwing, gained in Seoul in 1988, and one of the United Kingdom's best known athletes. Now that she is in retirement, her attention has turned to less energetic activities, though never far away from sport.

To add icing to the fame and fortune cake she has passed swiftly through the twilight zone of retirement and into the world of Acorn computers and games consultancy. Her latest Acorn project has been as the athletic consultant on the new game from Krisalis Software, *Quest for Gold*.

Quest for Gold, on which her practical advice and sound athletic knowledge, it is reckoned, will earn the game a reputation as being one of the most accurate simulators of track and field events. So how did she come to be involved so closely with Acorn and its Olympic game?

A NEW START

It all started after Fatima became president of Chafford 100, a club created to promote athletics and help train young people . . .

'We run development courses for 11-17 year olds in track and field events, 12 times a year with about 200 children each time,' she explained. 'It means coaching young children in the disciplines of track and field events to get them into their local track and field club, from where they will hopefully become Olympic champions.

'We're quite selective with the people we work with but we like to focus on the younger generation which is why we were attracted to Acorn, which is already known in schools for its BBC educational packs. We thought that was a good link with which to reach the children we wanted to help.'

Fatima is joined in her task by about 24 British athletes, such as Linford Christie, Steve Backly and Yvonne Murray, all of whom will be competing in Barcelona in the summer.

Quest for Gold seemed the obvious project for Fatima to involve herself with. 'It's been hard work but a lot of fun,' she said. 'My job was to work with the programmers in developing the game and tweaking the parameters to make it as realistic as possible.'

Her main input was in the management part of the game where the competitors are put through a five-week training programme to bring them up to scratch.

As theory has it, only an athlete who survives a well balanced and carefully thought out programme will stand a flying chance of beating one of the world records and, as has been shown so many times in the past, only the fittest survive.



THE ACORN CHALLENGE

As part of the promotion for Quest for Gold, Acorn dealers around the country are running 'The Acorn Challenge', a nationwide competition to find the greatest computer athlete. On July 4th, budding track and field stars will be invited to their local dealer to play the game and notch up a world record or two, followed on August 14th by the final which will be held at the post-Olympic welcome-home event in Birmingham. The four regional finalists will become official expenses-paid guests of the event and will compete in the ultimate battle for gold. The winners will be given the full ceremonial works complete with rostrum and national anthem and presented with awards by the real Olympic athletes.

Fatima's task was to calibrate the game to the real world and make the game's internal sporting 'intelligence' smart enough to resemble the logic (and good fortune!) of a professional coach.

She also advised the programmers as to what would be the maximum limits of exercise that any athlete can take before keeling over, belly up, and expiring.

'I think the game is great, not just because it is enjoyable but because it is also educational,' Fatima went on. 'You actually have to learn how to train an athlete so as to optimise his or her strength, power and general fitness.'

Fatima, the owner of an Acorn A5000, has been working on the project for over four months but it was only very recently that *Quest for Gold* evolved into a game that was actually playable. 'I've had a few goes and so have the other Chafford athletes who feature in the game. We thought it was very amusing and fascinating to watch ourselves in the form of computer generated characters.'

DIGITAL SURPRISES

Onlookers gathered to watch the athletes sit down to meet their digital namesakes for the very first time, at a press call last month.

It resulted in some revelations. Eyebrows were raised as it became entertainingly apparent that sprinter Linford Christie seemed to have quite a flair for the long jump, while javelin thrower Steve Backly appeared quite deft at leaping over the high bar.

It is hoped the game will be used to give youngsters an insight into the skills of managing an athletic square but, said Fatima, 'I think the Chafford 100 athletes will probably use it more for relaxation during the summer season.

'Barcelona is at the forefront of the athletes' minds as they gear themselves up. It's all systems go. I think British athletics will have its biggest tally of medals ever and when it's all over I'm going to go back to my A5000 and play a few more games of *Quest for Gold*.'

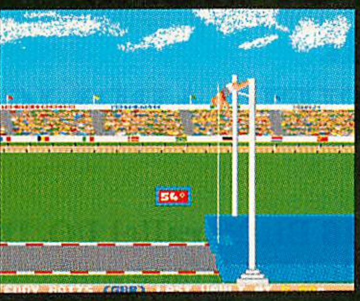
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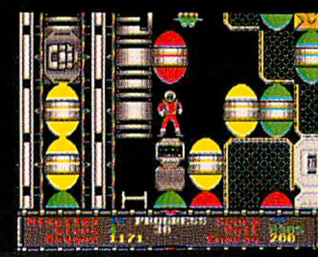

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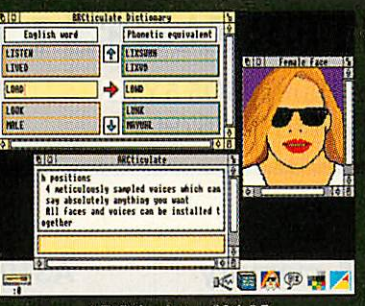

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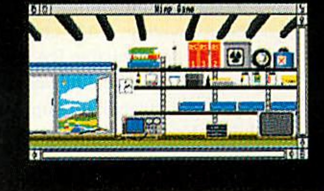
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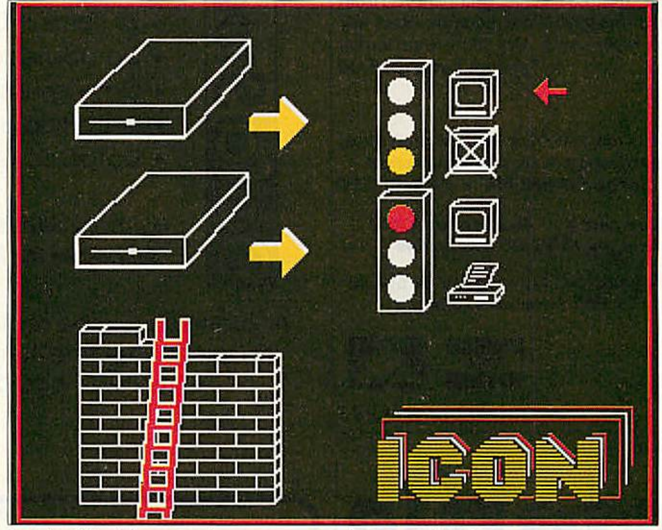

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Icon is the latest control language for the BBC Micro. Chris Drage checks it out in the classroom

MASTER CONTROLS

When a school upgrades to a new machine, such as an A3000 or Archimedes, the BBC B is often discarded in favour of the newcomer and left to vegetate in the corner. Yet this should not be the case. The eight-bit machines are ideally suited to supportive roles, such as in control technology, where speed and graphics are not the priority. And another bonus is that the Beeb has all the ports built-in.

It seems apt, therefore, that the latest control 'language', *Icon,* is available primarily for the BBC B and Master 128. New control interfaces such as Sense and Control have given the area of control applications a new impetus. And this obviously inspired the appearance of *Icon*, an icon-driven control application.



Icon's pictorial approach can overcome language barriers

The most well known control language is Logo, where a toy turtle is driven around the floor according to the instructions given. But control extends further than this, into the field of robotics and the control of electronic switches. *Icon* is used with the chosen control interface for various tasks – an example is a simple program to make a bulb illuminate for five seconds after a switch is pressed.

Icon itself includes six 5.25in 80-track discs and a comprehensive handbook. Six discs are needed because the program comes in two versions. One is for use with Sense and Control and one works with the standard eight-in/eight-out buffer boxes such as the Control-IT box or one of its derivatives: the Barnet Box, Brent Box and Redbridge Box. These boxes allow for eight input and eight output lines and are controlled via the user and printer ports.

The Sense and Control version of *Icon* uses the BBC Micro as a host computer for program development. The final program is converted into machine code and transferred to Sense and Control via the serial cable. It can be tested by running it with Sense and Control connected to the host computer, to provide a display of the states of the input and output ports.

When the the program is running correctly, Sense and Control can be disconnected from the Beeb and run as a stand-alone controller. In the BBC Micro version a Beeb is used for both program development and as the control computer – in other words, the program is converted into machine code to run on the BBC Micro.

Whichever option you use, a set of icons on the initial menu screen, allow programs to be loaded from disc for editing, printing, running or transferring to a Sense and Control unit. The building screen is completely icon-based.

There are icons for all the various stages in the control process, such as links, inputs, processes and outputs. These include two switch icons (press to make/press to break), analogue sensor, timer, counter, pulser and output memory and interface.

A 'page' icon shows which page of the program you are working on – essentially this is a screen where a diagram of the program is created. Using links, the various components of the system are pieced together and their labels and values are added. Quite complex control applications can be constructed.

The 85-page A4 handbook is a model of clarity, taking the user through every step, including the connection of the various components. It, laudably, adopts a tutorial approach and everything is graphically illustrated, with sections for both teachers and pupils who may have differing levels of expertise.

Icon differs considerably from *Logicator* (by Economatics). This rival program uses on-screen flow charts to allow pupils to define all the steps in a sequence and map each step in turn. *Icon* is more akin to designing a multi-input electronic circuit.

It is a good idea to have a hierarchy of languages available. A simple language like Logo is fine for introducing the subject of control as it follows on from what primary school children are doing with Logo. But, for most children at Key Stages 3 to 4, control Logo is unable to cope with complex operations.

Icon enjoys several advantages over most other Beeb control languages: it is fast – ideal for control applications which need quick responses – and it simulates parallel processing. As it is non-verbal, *Icon* helps remove language barriers and offers access to those with special educational needs. Altogether, *Icon* offers a comprehensive control application for Key Stages 3 to 4. Thoroughly recommended.

PRODUCT DETAILS

Product: Icon
Supplier: TICST
Tel: (0602) 418418
Machine: BBC Micro
Price: £47.50

Product: Logo
Supplier: NCET
Tel: (0203) 416994
Machines: A3000
Price: £16.50

Product: Sense and Control
Supplier: Educational Electronics
Tel: (0525) 373666
Price: £179

QUESTIONS AND ANSWERS

Q I recently bought an A3000 to support my work as a Maths teacher and, to indulge my interest in numerical programming, I also purchased a copy of the *C Development System* from Beebug/Risc Developments.

I found this system convenient to use and well supported, but my problem is the speed at which programs calculate. The code seems to run at around 10,000 floating-point multiplies per second, which is the same as Basic, whereas I was hoping for a speed improvement of two to five times. Worse still, functions like sin(x) take longer than those in Basic. Is this speed typical of the A3000 or would some other compiled language such as Pascal or Fortran be faster?

K Burnett
Birmingham

A The *C Development System* uses two floating-point data types called float and double (single and double precision respectively) so first check that your real variables are all defined as floats. While you're at it, make sure that any variable that remains an integer throughout the program is of type int.

Functions like sin(x) appear slow because, to gain accuracy, they use double precision multiplication which takes much longer than the single precision equivalents. To understand this, try timing yourself doing long multiplication on two five digit numbers and then on two ten digit numbers! If your need for accuracy allows it, try writing a sine function which takes a 'best fit' from a look-up table of a few hundred points for the first 90° of the curve.

Calculation speeds do depend on compiler efficiency but C has a 'fast' reputation and I see no point in changing languages unless you find something particularly whizzy. Risc Developments has said that if you send in a copy of your source code, they'd be happy to look it over and perhaps offer some pointers.

STAR QUESTION

I am a final year polytechnic student planning to undertake a complex graphical project on my Archimedes A420/1. The project will involve three-dimensional solid modelling and fractal geometry, requiring high graphic resolutions and tremendous processing power! At present, I'm struggling over which upgrades to buy. Should I purchase an Arm3 and floating point accelerator now or will Acorn release Arm6 before September? Is Acorn going to announce a new video chip? Are there any graphics cards that offer 1024 x 768 points x 256 colours on the desktop?

Anil Patel
Surrey

The Arm600 processors described in recent issues of *BAU* are 'building block' devices that may form part of future Acorn and Apple computers. They are not designed as replacements for the CPU in your Archimedes. If Acorn is going to release a further processor upgrade or a new video chip so soon after launching the A5000, I haven't been told about it!

On the display front, PCATS is developing a number of graphics cards that more than meet your resolution needs, but they don't use the desktop. This is because of a design approach popular in Cad and high-end DTP where operators use two screens, one for program control and the other to display the high-resolution graphics uncluttered by menus, icons and other trivia. If you want to know more about these products, write to Patrick Arnold, 12 Paul Street, Frome, Somerset BA11 1DT.



READER TIP

Many thanks to Omer Roucoux of Dunstable, who wrote to us in response to a problem in the June *BAU*. Mr Coles of Rickmansworth, wanted to print in Greek from *Pipedream* on an Archimedes, and Omer has suggested that he should buy a copy of a font called *Symbol*, which is actually Greek without any accents. This is a public domain program and is available on disc from ArchAngel PD, PO Box 41, Exeter EX4 3EN. You can run it in *Pipedream* with the help of the *Acorn Outline Font Manager*.

Q Recently, after years of loyal service, the antiquated 40-track single-sided disc drive on my BBC finally hurled its read/write head across my front room and I decided to buy another. I went to a computer fair and picked up a second hand 40/80 switchable double-sided drive and everything was fine until I had the crazy idea of freeing up my existing discs by transferring them onto 80-track format and using both sides.

I loaded a 40-track disc into the drive with the switch set to 40; entered *ENABLE, then *BACKUP 0 0 and away we went. At the prompt for the destination disc, I flipped the switch to 80-track mode and put in an 80-track disc. I then got an error: Disk Fault 08 at 09 09. I've reformatted discs, tried others, checked the disc controller, verified the discs, prayed, and finally given up. In all other respects, the drive seems to work fine. Can you please help?

Rik B Gray
Leeds

A Contrary to popular belief, the BACKUP function does not just copy all data from one disc to another. What it actually does is to copy every byte of every sector on the source disc to the exact corresponding location on the destination, producing a 'clone' of the original. If the two discs are formatted differently, this 'one to one mapping' is impossible and an error will occur.

Your DFS Rom may be sufficiently well-written to sense changes between 40 and 80 track formats during *COPY 0 0 *.* . If this doesn't work you must either buy a better DFS kit or persuade someone to loan you a twin 40/80 drive while you do your tidying up.

Q I have a BBC Master and I am currently looking for a good combination of a graphics package and colour printer. (I am thinking about buying a Star LC200). It seems that putting such a package

together is difficult, as the new generation of printers does not seem to be compatible with the software. I would be grateful for your advice.

A Telford
Weston-Super-Mare

A **Since the release of the BBC Master, most software authors have turned towards newer, more powerful, machines. When most Master software was written, colour printers were still very expensive and therefore unsupported.**

A nice BBC graphics package for you to consider is *QuestPaint* from Watford Electronics on (0923) 237774, which has an inbuilt greyscale printer dump but does not directly support colour printing. However, like many BBC programs, it will save screens to disc so they can can be printed with a suitable dump program such as the Colour Screenprint Rom from ESM on (0223) 65445.

This comes in three versions, one for nine-pin colour like the LC200; one for 24-pin printers; and one for inkjets like the Integrex Colourjet 132. Picture quality varies a lot between different printers, so I suggest you look at a few samples before you decide.



Sprite conversion made cheap and easy with Translator

Q I recently bought a second-hand Master 128, and am not afraid of poking about inside it. I'd like to install a headphone socket and a switch to turn off the internal speaker. Can you help?

R Jukes
Cleveland

A **The easiest way to do this is to break the connection between one side of the speaker and the plug joining it to the main board and re-route the wire via the break contacts on a switchable jack socket. On a BBC B, a 0.25in jack socket fits nicely in the hole where the Econet socket would otherwise go.**

The output signal from this modification is a bit low, and more suited to line level than to headphones so, if you want it loud, you may be better off running a cheap headphone amplifier from the phono socket and using OS calls *FX 210, 0 and *FX 210, 255 which enable or disable the speaker.

Q I have an Archimedes A440/1 on which I am writing a fractal generator. I would like to store images as *Tiff* and *JPEG* files, as used by many other Archimedes packages. How can I do this?

Amit Gupta
Lewisham

A **Archimedes sprites can be converted to Tiff files, and vice versa, using two public domain programs called Translator and Creator, available from most PD houses.**

JPEG is a proprietary data compression system from DT Software (0223) 841099. JPEG is not in the public domain, so if you plan to incorporate it in your program and sell or give away copies, you must get a licence from the copyright holder first.

CUSTOMER HOT LINE

Every month in BAU, Peter Glover from the Acorn customer service department offers you Acorn's advice and support

Risc Os provides a number of shortcuts which make performing many tasks easier and quicker. Risc Os 3 has introduced additional new features which improve the situation still further. To see the effects to best advantage, why not try them out as you read this?

● The Adjust Button

The Adjust button is generally used to provide some option which behaves like the action produced by clicking Select, but is subtly different in some way. Alternatively it may provide a short cut to a dialogue window. The one thing it should never do is exactly duplicate the action of Select.

Some of these facilities are provided within Risc Os, while others rely upon the author of an application to implement them in a standard manner. The action of the mouse buttons, and many other issues relating to the user interface, is covered in the *Risc Os Style Guide*.

★ The usual method of dragging a window is to use the Select button on the title bar. This brings the window to the front as well, which can sometimes disrupt a layout of windows which has taken some time to build up. However, if Adjust is used, the window can be dragged, but will retain its position in the stack of windows.

★ To move the work area of a window you may either drag the scroll bar, or click Select on the up/down/left/right arrows (if provided on that window). Clicking Adjust on one of these arrows moves in the opposite directions to Select, which saves having to move to the opposite arrow if you overshoot while scrolling a window.

★ The idea of Adjust performing the opposite of Select also appears in some dialogue boxes (eg the zoom setting in *Draw*). Clicking Select will increment a value, but clicking Adjust will decrement it. This helps to reduce mouse movement.

★ Clicking Adjust on the close box of a filer window will open the parent directory for the one which you closed. Some editors also support this – meaning that Adjust on the close box of an editor window will open the directory viewer containing the file which was being edited. More tips next month . . .

● Pound Signs and PC Emulators

Some users have been unable to get the £ sign under the PC Emulator. This is due to there not being a £ key on a US layout PC keyboard. You can reprogram the # key to produce the £ by adding to AUTOEXEC.BAT:

```
@ECHO ON
PROMPT $e[35;156p
CLS
@ECHO OFF
```

. . . and to CONFIG.SYS:

```
DEVICE = ANSI.SYS
```

● Did you know . . . ?

If you drag a file/directory or application on to a RISC OS 3 *Edit* window with the SHIFT key held down the name of the object is inserted. This can make building boot files much quicker. It also works with *SrcEdit* which is supplied with Desktop C/Assembler.

Programs which were written in C (including *Edit*, *Draw* and *Paint*) have keyboard shortcuts available when a dialogue box is being displayed. Pressing F1 reacts like clicking the first icon (icon 0), F2 for the second (icon 1) and so on. In addition, if a letter key is pressed an attempt will be made to match it against a capital letter in a field. Thus, using *Edit*'s Find window as an example, you can repeat the last search by pressing F4 F2 F1. Similarly when a match has been found you could use C or F2 to Continue, R or F3 to Replace and so on. This shortcut may not work, though, where the input focus is also within the window.

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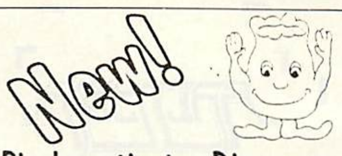
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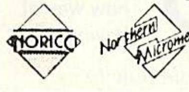
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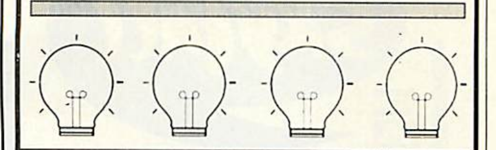
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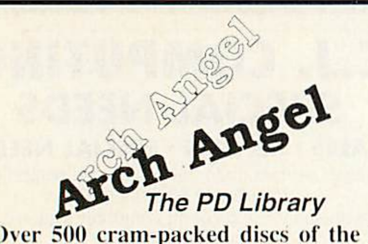
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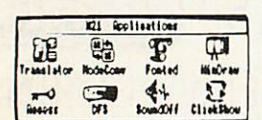
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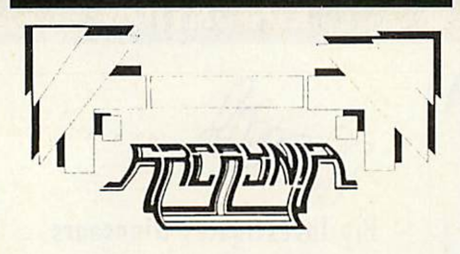
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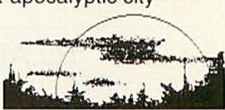
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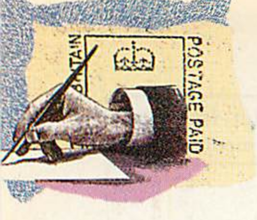
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ACORN USER ADVERTISEMENT PAGES – AUGUST 1992



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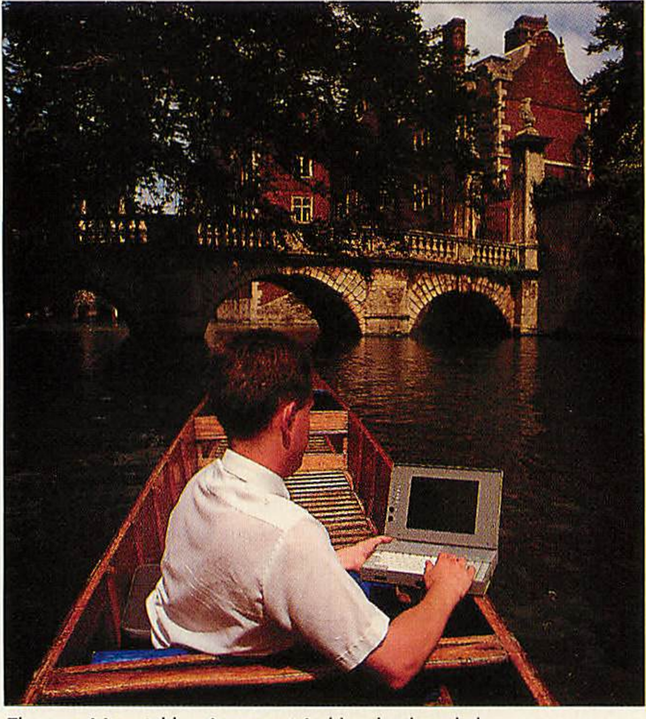
I really am enormously pleased with my Archimedes A5000. I graduated to it some months ago via the traditional route – the BBC micro.

It has revealed itself slowly to me. Still, I can at least kid myself that this tempered unbuttoning is more enjoyable than a blinding flash of insight. Each time I try something new I am delighted with the machine's versatility.

Actually, I have always considered computers to be dumb beasts, allowing one to be totally stupid without any protest. The Arc is just as bad – or is it? Mine produces little messages in the top-left corner of printed sheets from time to time. The one which reads E§¥²µ³=! really has me wondering whether I have bought an electronic Einstein.

Michael Fancourt
Lymington, Hants

The most probable cause of this is the computer sending instruction codes to the printer when it's not ready. This can be caused by using the wrong printer driver, or putting the printer on-line just after the computer has started to send data.


The new A4 portable – Acorn, not Archimedes, branded

PORT OF CALL

I read with interest the article comparing the A5000 with an Apple Mac and a PC. I use an A5000 at home and use several different types of PC at work and found that the article did not really tell me anything about that machine that I did not already know. The information concerning the Mac was useful, though.

However, there was a serious omission from your article – after-sales service and warranty repairs. Now let me tell you a story. . .

The RS232 port failed on my A5000 and the RTS line was not working. I telephoned the supplier, who agreed to sort out the problem if I brought it back to him. Before setting off, I decided to 'phone the dealer to let him know I was on my way, but he said there was a problem. Apparently, dealers can no longer swap boards, but have to send machines away for repairs, which can take up to 10 days.

Compare this with PC repairs. All the owner has to do is visit their local PC supplier and swap boards until everything is working. This takes a couple of hours and costs practically nothing. If you were a small business, which one would you go for?

But this story does have a happy ending. After mentioning my rights under the Sale of Goods Act, the dealer spoke directly to Acorn and, after a nail-biting half-hour, it was decided that the board would be changed on the spot. I arrived home later that day with a working RS232 port.

C F Beesley
Cheadle, Staffs

WHERE'S INTERWORD?

I really must take issue with Ian Burley over his article on word processors (*BAU*, June issue). He makes no mention of a program which I would not be without – *Interword.* This package works far better on the Archimedes than *Wordwise*, which he did include.

Interword is more a WYSIWYG (what you see is what you get) processor of the modern school than *Wordwise*, it is more user-friendly than *Pipedream* and far more capable than *First Word Plus*. Its only drawback is that it is not, nor does it attempt to be, a DTP lookalike.

Can it be that Computer Concepts wants to relegate *Interword* to history so that the company can recoup its research costs by publicising *Impression* to the widest market? To do this, the company has to make out that *Impression* is a better word processor than it really is.

This does not mean that I do not like and use *Impression* – I wouldn't be without it. Neither would I be without *Interword*, or *Pipedream*, for that matter. Each has its place.

Elwyn Morris
Harwich, Esse

ACORN BRANDING

On re-reading Graham Bell's article on the A5000 machine (*BAU* December 1991) I noticed his statement that, while the new disc drive is able (with the right programming) to read Apple Macintosh 1.44Mb discs, it will never be able to handle Amiga 880Kb and Mac 800Kb discs. Why is this?

I would have thought that the Amiga and Mac would have been prime targets for compatibility now that the IBM PC and the BBC are already supported. In particular, the development of a central 68000 processor emulator could allow emulators for the Mac, Amiga and Atari ST.

If the latest Acorn drive cannot read these discs, will anyone supply drives which can?

While Acorn's 'odd' behaviour is generally accepted as its style, compatibility may well be important if Acorn wishes to compete seriously with the Mac/PC for professionals, and the Amiga for home use.

The suggestion that an Archimedes joystick-equipped games machine is in the pipeline certainly indicates that Acorn is at least interested in this market.

On the subject of new Arc technology, is Risc OS 3 available as an upgrade yet? If not, when will it be? And whatever happened to the rumoured floating point processor (FPA), which has had space reserved in the chips since Arm3's introduction in 1990? And why is Acorn so keen to drop the Archimedes label?

Stuart McDonald
Southampton

Acorn is keen to reinforce its corporate name rather than individual brands, which is why the new portable is called the Acorn A4, not the Archimedes A4. The Risc OS 3 upgrade is due soon. There is no word yet on FPA.

GETTING WET

I am writing to congratulate your magazine on the excellent program, *Water World* (*BAU* July 1992). After spending an afternoon typing it in, I found it the best type-in listing ever.

If this is going to continue, I'm going to have to buy your magazine more regularly.

Matt Kneebone
Mold, Clwyd

***Water World* was submitted by a reader just like you. If you've written a program that you think other readers would like to see then send it into *BAU*. The best programs will appear in the magazine.**

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